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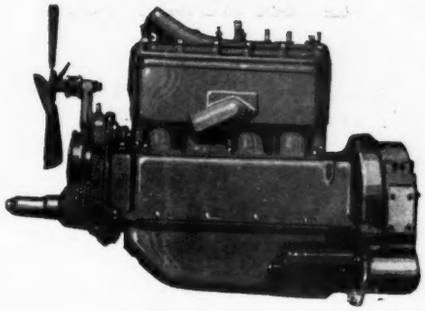
Car Manufacturers Are Studying Available Motors to Meet the Trend to Fours



THE present swing to fours does not indicate to any thoughtful car manufacturer that the mere fact that a car is powered with "a four" is sufficient to meet the market.

In fact, the real influence back of this swing is the car buyer's increasing insistence upon getting the utmost increased value at the lower price range.

So the manufacturer who does not buy his motor with the same insistence upon value for price will not have the kind of car that the public will buy.

We encourage more careful motor buying by the car manufacturer because our experience has been that the more carefully he studies four-cylinder motor design, quality and workmanship and the ability of available plants to produce his motors in quantities at correct costs then the more the Lycoming advantages are emphasized to him.

Find out what you need to know about the Lycoming Motor, today.

The LYCOMING MOTOR

LYCOMING MOTORS CORPORATION
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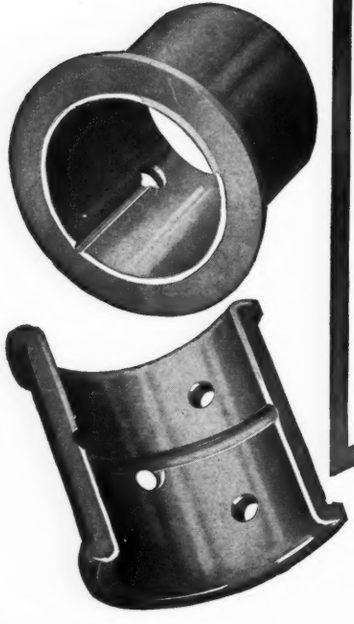

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIV. NEW YORK—THURSDAY, APRIL 14, 1921 No. 15

Importance of Taxes to Automotive Vehicle Sales

The sales resistance must increase as the cost of maintenance increases. The taxes proposed in pending legislative suggestions will mean a levy of $63 per vehicle. Steady increase of taxation is indicated.

By Clyde Jennings

IT IS, of course, repeating a truism to say that the marketing of automotive vehicles has been grossly neglected, as compared with the designing and production of the vehicles. The same statement might be made about any other new industry, at least in the period before it had reached a stage of positive development.

There has been practically no sales research or analysis as regards the automotive vehicles. Many manufacturers have seriously discussed the saturation point, when a few hours of organized study of the possibilities of the vehicle they were making would have convinced them that the saturation point of transportation would come when civilization became fixed.

Even a casual interest in the points of resistance to the sales of motor vehicles would long ago have convinced any one interested that one of the chief points of resistance was

The continual threat of higher taxes upon the vehicle.

Had this point been appreciated years ago the present acute situation would not have arisen. The industry would have been forewarned and prepared for the situation that exists, and it would have been more of a passing incident than an acute situation.

The writer well remembers talking with a member of a Southern State legislature a few years ago when he spoke of a bill that had come quite near passing which would have taxed automotive vehicles out of that State. He was asked who opposed the bill. The answer was:

> **"Chiefly a few members of the legislature who owned cars or trucks and who saw the possibilities of these vehicles. A few private motor car owners came to our aid. A dealer or two showed some interest, BUT NO MANUFACTURERS."**

This was the situation until a few years ago. Beginning with the war period the legislative and tax problem has been given more consideration. When America finally went into the war, the question of luxury or necessity became acute and it was quite seriously debated. On the face of the returns the automotive industry was the victor in that argument. At least trucks gained the right of way, but the passenger car went into the discard—as the cards were written for the next year's program.

The situation was never entirely worked out, thanks to our army in Europe. Then the manufacturers went home and to a considerable extent forgot about that battle over the necessity of the automotive vehicle except on those occasions when reminiscences were the order of the evening. This is not in any way a criticism of those who worked so valiantly and well for the industry in the crisis of that period.

The next move was a logical one—the organization of the Motor Conference Committee.

The idea behind the Motor Conference Committee is a good one and it is working out very well. The only criticism here is that the organizations behind the committee have not seemed to appreciate the need of this work, nor the need of support to be given by personal efforts of work that the Committee might do. The industry has never appeared to appreciate the power of the individual in legislation.

The greatest single step toward a remedy for the situation as it has existed was the writing of the Proposed Uniform Vehicle Law and the concentration upon that law for proposed legislation. Granted that the law is not exactly what any one of the persons interested would write, it is the best that can be agreed upon by the various elements interested in this legislation. A concentration upon a measure of this sort is a constructive effort to regulate taxes from the state, and these have been by far the most important item of taxes.

But now comes the question of Federal taxes, and, because the industry has not been in training in matters of constructive legislation work, it is not prepared to meet the situation. Then, too, even within the industry, the proposed Federal taxation figures take entirely too alarming an aspect.

It is the truth that the bulk of the increases of taxes, fees, etc., made possible in legislation in the several states promises to equal the proposed taxation by the Federal government, yet there has not been centered upon the legislation in the states anything like the activity that is being brought to bear in the Federal situation.

The suggestion is this:

Legislation in Federal, State and municipal governments is working constantly and should be under constant observation. There should be a steady pressure exerted for fair and intelligent legislation. It should not always be mere fighting of legislation. Automotive vehicles are property, and there should be taxes on them, but it should be a fair and consistent taxation, in keeping with the necessity and value of the article taxed.

All states collect fees and licenses on automotive vehicles and many states levy an additional fee upon any person who holds a driver's license. The total of these fees and licenses amount to more than $100,000,000. The tabulation of the registration figures showed in excess of $91,000,000 and in many cases the reports there were not for the full year. Also this tabulation does not include municipal fees, which are collected in many large cities.

In addition there is a very large personal property tax on automotive vehicles in those states where a personal tax is levied. C. A. Vane, general counsel for the National Automobile Dealers' Association, has estimated the personal taxes collected on automotive vehicles at $80,000,000. Vane's estimate is that the state taxes and fees for the last year were about $200,000,000. They will be greater this year. How much greater cannot now be accurately estimated because the legislatures are not yet through with their job of increasing fees.

An increase of taxes means increased sales resistance. This, certainly, will not be disputed.

A man may be perfectly willing to pay $3,000 cash for something and be absolutely **opposed to the idea of assuming an obligation to pay a tax of $75 a year for the privilege of spending that $3,000.**

The present situation is rather acute because many states have been deprived of their revenue from liquor licenses without preparation (such as usually takes place when a state goes dry by its own vote) and the lawmakers are looking for the easiest (not best) method of raising money to replace this loss. As is stated elsewhere in this magazine, in an article by Alvan Macauley, it looks on the surface as though the man who drives a motor could easily pay for this privilege.

Naturally the suggestion of former Secretary of the Treasury Houston that almost $300,000,000 of additional taxes be levied annually upon the motor equipment of this country looked too startling to those within the industry to be true. There was a good deal of astonishment that the new administration showed signs of approving of this tax as outlined by the retiring Democrat.

But the fact remains that these suggestions by Secretary Houston are still being considered seriously. AUTOMOTIVE INDUSTRIES printed the following statement of Secretary Houston's annual report in the issue of December 2, 1920:

IN his annual report, Secretary of the Treasury Houston has made specific recommendations for raising the $5,000,000,000 which the present administration considers necessary for running the Government next year. The part of the tax recommendations which are of especial interest to the automotive industry are:

1. Increase of the sales tax from 5 per cent to 10 per cent, which it is estimated will make an increase of....	**$100,000,000**
2. A Federal license of cars based on 50 cents per hp.....	**100,000,000**
3. A consumption tax on gasoline at 2 cents per gallon.....	**90,000,000**
4. The truck sales tax will be continued at 3 per cent, despite efforts to have it eliminated.	
New taxes from industry.....	**$290,000,000**

The 10 per cent sales tax is applied, as now, to passenger cars, motorcycles, parts and accessories for these vehicles and will include tires.

These recommendations by Secretary Houston are about what those of the industry who are familiar with the tax tendencies expected from his report. They are practically the same as those recommended in the preliminary report of the National Industrial Conference Board. When this report was brought up for hearing recently at a New York meeting of the Board, the National Automobile Chamber of Commerce appeared before the Board and asked that these tax recommendations be revised. It was then shown that the automotive industry in 1919 paid almost $150,000,000 in excise taxes to the national government, as follows:

1. Excise taxes on motor car sales.....	**$77,000,000**
2. Excise taxes on truck sales.....	**14,000,000**
3. Excise taxes on parts and accessories	**52,000,000**
1919 taxes.....	**$143,000,000**
In addition the automotive equipment pays:	
State and municipal registration fees...	**$64,000,000**
State and local taxes on the valuation for personal taxes.....	**50,000,000**
	$114,000,000

When this showing was made to the Industrial Conference Board that body immediately agreed that the industry was paying its share of taxes and they decided to make no recommendations for increased automotive taxes. During the hearing a member of the Industrial Conference Board asked if the industry did not want

Where the F

Graphic Presen

e Federal Tax Money Goes

esentation of the Annual Appropriation Bills

A BRIEF study of this graph will quickly show where governmental economy must be enforced to make a showing in the taxes.

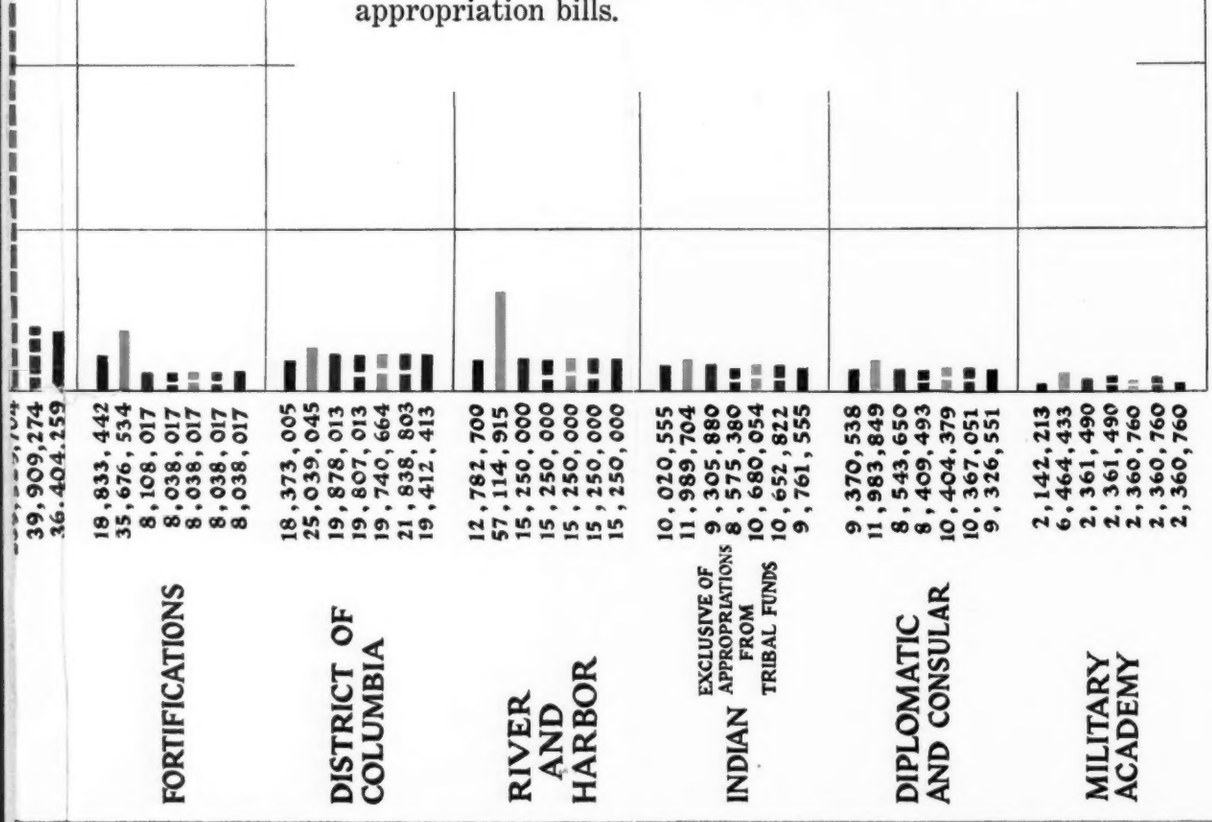
It must be kept in mind that the Postoffice and Pension bills cannot be changed much, the first because of the utility involved, the second because of the obligation.

It will then be seen that the only opportunity for making a sufficient showing is to economize as regards the following appropriation bills:

Sundry Civil
Army
Navy

A total of all appropriations below the pension appropriation bill, as presented in the graph, represent only 9.6 per cent of the total in the annual appropriation bills.

HOUSE COMMITTEE
USE
SENATE COMMITTEE
NATE
FERENCE



national registration of cars. The answer was that while this might be very desirable, the industry did not want to pay $100,000,000 for such registration.

Taxes in 1920 were much higher than in 1919. Let us assume that they amounted to $200,000,000.

The attempt to show just how a total tax levy of probably $800,000,000 on the automotive industry would increase the sales resistance would be a waste of time. The person who cannot see in a measure the result of this taxation on sales is hopeless. The estimate is arrived at in this way:

State fees and taxes for 1920	**$200,000,000**
Proposed and existing Federal taxes and fees	**500,000,000**
Probable increase in state fees and taxes	**100,000,000**
Total	**$800,000,000**

Let us assume that the registration during the year will be increased 500,000, making a total of cars and trucks registered at the end of 1921 of about 9,500,000. This would make an average of taxes and fees for each vehicle registered in the United States of almost $85 a vehicle.

And we might add here that the N. A. C. C. had said that the average wholesale price of cars sold in 1920 was $897.

At this rate America would soon have taxes and sales problems similar to those of several European countries, and likely a similar decreasing registration of automotive vehicles.

In this connection it must be remembered, always, that every automotive factory, salesroom, garage, and this also includes parts factories and hundreds of machine shops, pays local taxes and fees in large amounts. These taxes are, of course, the same as are levied on other industries.

A Brief Analysis of the Annual Appropriation Bills

IT is of little use to criticise any movement, whether public or private, without a constructive suggestion. It is particularly foolish to make a demand of a government, which is "for the people, of the people and by the people," that it economize without pointing out wherein the people are willing that economy should be exercised.

For many years the people have been going to the Government and demanding economy in one breath and advocating expenditure for their favored enterprise in the next. The board of trade of any particular community is very likely to pass a strong resolution demanding greater economy in government so that taxes may be lowered, or even go to the extent of demanding the removal of a certain tax, and then the next day pass a resolution that their city should be favored with a new public building or that some local improvement should be included in the River and Harbor Bill.

This sort of criticism and demands are certainly not constructive. It is fortunate that the National Automobile Chamber of Commerce this year has adopted a different policy as to their tax communications with the Government. Briefly, the attitude adopted by the Chamber is:

> **That the people are stockholders in the Government; the legislative and executive departments of the Government are merely directors of this business body owned by the people; the Chamber and other business and civic organizations propose to advise the Government.**
>
> **FIRST, to economize, and,**
>
> **SECOND, wherein economy may be practised.**
>
> **It is not the policy of the Chamber to attempt to dictate what sort of taxes shall be levied. The actual levy and collection of taxes is to be left to the judgment of tax experts.**

As preliminary to this rather unusual tax program and as the first step in carrying forward this argument, the Chamber has obtained a graphic presentation of the Annual Appropriation Bill for 1922. This presentation indicates the amount of money asked in each of the bills. This graph is reproduced as a part of this article and as an insert in this number of AUTOMOTIVE INDUSTRIES. A glance at the graph will convince the most casual reader that he has probably had a very inaccurate idea as to the actual expenses of the Government. An analysis of this graph is perhaps necessary:

Post Office Bill. This bill is at the top of the graph. It is really not an appropriation bill in the sense that they are to be considered here. The Post Office is practically self-sustaining and the appropriation by Congress is merely permission to spend its own money. The fact that this bill is considered as other bills is a part of the archaic practice of the Government that has been maintained.

Sundry Civil. This bill is the second in the graphic presentation and the line indicating the amount of the estimate is the longest of all the lines in the presentation. It indicates to what extent the governmental experts and others concerned have desired money for the various enterprises concealed under this meaningless title. The line indicating the current appropriations is just a trifle longer than that for the Navy; the appropriations, as passed, being slightly more than $2,000,000 greater. The Sundry Civil Bill is probably open for attack more than any other of the bills. It includes much that is worthy and perhaps indispensable to the Government. Part of the bureau's expenses which are included in this bill are the Interstate Commerce Commission, the War Risk and Soldiers' Rehabilitation. These are quite heavy items in this bill. There are numerous other commissions, the expense of which is carried in this bill from year to year that are not so indispensable. It is seldom that a Congress adjourns without creating several commissions, the object of which seems to be to provide for the "lame ducks" of Congress. The current Sundry Civil Bill has also been "loaded" with numerous civilian army and navy employees. These are commissions and employees left over from war practice which it is hoped to maintain in office. The Army and Navy estimates were so large that it was necessary to place them elsewhere and they were put into this bill. A discussion of the worthiness of these cases would become a discussion of each individual commission. This bill is one that will bear inspection very closely.

Navy. The next highest appropriation bill is that for the Navy. The Navy Bill was passed only by the House.

Army. The Army ranks third in the amount of money asked and fourth in the amount of money appropriated. It was not signed by the President.

A discussion of these two bills will not be entered upon here. Primarily the amount of money to be appropriated for the Army and Navy in the minds of each individual is merely indicative of his attitude toward the question of national armament. Those who are inclined toward a pacifist attitude advocate much reduced appropriations.

Pension. The Pension Bill represents an obligation that the Government has assumed and should not be a part of this discussion.

The five bills already referred to constitute 90.4 per cent of the Annual Appropriation Bill. Below these come the **Legislative,** which is really a very important bill; its real title is Legislative, Administrative and Executive bill and it includes the expenses of Congress, the judiciary, executive departments and from which appropriation practically all civilian employees in Washington are paid; the **Agriculture,** which includes the wide and profitable activities of this great department; **Fortifications** Bill is camouflage for a part of the Army Bill; **District of Columbia** Bill, about half of which is raised by local taxes and the other half is assumed by the Government because of the great demands made by the Government upon this District.

River and Harbor Bill, commonly known as the "pork barrel" bill, is perhaps more widely discussed in newspapers and other publications than any of these bills. This bill has long been one which carried many appropriations for local improvements. Because it hits in so many states, it is much discussed and, of course, every community criticises every appropriation in it except that for their own local purposes. It is really of minor importance.

It has been necessary on the graph, as presented here, to exaggerate somewhat the lines showing the amounts in the next three bills, the **Indian, Diplomatic and Consular,** and the **Military Academy.** These are such small factors in the expense of the Government that if they were wiped out the decrease in taxes would be so slight as to be unappreciable.

It is usually the case that the amount of the various appropriations and the purpose for which they are intended are entirely lost sight of in a discussion of the kinds of taxes to be levied. During the present tax discussion the sales tax has been the topic of a great deal of discussion. In the question as to whether the sales tax should or should not be levied there have been brought out so many opinions and some rather earnest controversies that the persons engaged have not had time to really discuss the purposes of taxation.

There is no dispute on the part of the automotive industry that the Government needs large amounts of money to recover from the effects of the war and that the automotive industry and automotive vehicle owners must pay a proportion of these taxes. It is only a question of what a fair proportion of these taxes shall be.

It is entirely appropriate that in this discussion the industry should be considered as to whether it is a utility industry or a luxury industry. But that question is one very difficult to discuss, because what is a necessity to one person is not to another. There is no question that in the taxes as levied through the bills of a few years ago much injustice took place. There were also many gross inaccuracies. Due to the fact that many articles escaped taxation by technicalities, there is becoming a serious sentiment among serious persons for a general tax on all articles of manufacture or commerce except the few absolutely necessary staples which enter into every person's life. The sentiment expressed in the N. A. C. C. resolution that the technicalities of taxes be left to the experts is also gaining ground.

Of course, there are other expenses of the Government besides these Annual Appropriation Bills. These include the interest on public debt, sinking funds, expenses of loans and already incurred obligations such as year to year road policy and things of that kind. These appropriations should not be the subject of a discussion of this sort. The obligation has already been incurred.

The entire appropriation program is here presented as printed in the *Congressional Record* of March 4, 1921. This information supplements the figures shown in the graph.

From Congressional Record of March 4, 1921

Table comparing, by bills, estimates of regular, supplemental, deficiency, and permanent annual appropriations for the fiscal year 1922 with the appropriations made for the fiscal year 1922.

Regular Annual Appropriation Bills (Completed)	Regular Estimates Fiscal Year 1922	Supplemental Estimates, Fiscal Year 1922	Total Estimates, Fiscal Year 1922	Appropriations, Fiscal Year 1922	Increase (+) or Decrease (—) 1922 Estimates Compared with 1922 Appropriations
Agriculture	$41,989,384.00	$11,040,000.00	$53,029,384.00	$36,404,259.00	—$16,625,125.00
Army (including Military Academy)	699,275,502.93	.....	699,275,502.93	346,703,906.80	—352,571,596.13
Diplomatic and Consular	11,983,848.94	.....	11,983,848.94	9,326,550.79	— 2,657,298.15
District of Columbia	25,039,044.99	.....	25,039,044.99	19,412,412.99	— 5,626,632.00
Fortification	35,676,533.66	.....	35,676,533.66	8,038,017.00	— 27,638,516.66
Indian	11,989,703.67	.....	11,989,703.67	9,761,554.67	— 2,228,149.00
Legislative, etc.	136,452,634.97	762,080.00	137,214,714.97	110,345,018.75	— 26,869,696.22
Pension	265,190,000.00	310,000.00	265,500,000.00	265,500,000.00	.....
Post office	585,406,902.00	.....	585,406,902.00	574,057,552.00	— 11,349,350.00
River and harbor	57,114,915.00	.....	57,114,915.00	15,250,000.00	— 41,864,915.00
Sundry civil	803,446,196.86	3,018,749.00	806,464,945.86	384,196,760.41	—422,268,185.45
Total, regular annual appropriation bills	2,673,564,667.02	15,130,829.00	2,688,695,496.02	1,778,996,032.41	—909,699,463.61
Regular Annual Appropriation Bill (Pending)					
Naval (as passed by the House)	679,515,731.47	.....	679,515,731.47	396,001,249.23	—283,514,482.24
Total, regular annual appropriation bills	3,353,080,398.49	15,130,829.00	3,368,211,227.49	2,174,997,281.64	—1,193,213,945.85
Permanent and Indefinite Appropriations					
Interest on the public debt	922,650,000.00	.....	922,650,000.00	922,650,000.00	.....
Sinking fund	265,754,864.87	.....	265,754,864.87	265,754,864.87	.....
Expenses of loans	.....	.....	.....	.....	.....
Roads, construction of	1,000,000.00	.....	1,000,000.00	1,000,000.00	.....
Customs Service, repayment, etc.	27,000,000.00	.....	27,000,000.00	27,000,000.00	.....
Indian funds, and interest on same	23,475,000.00	.....	23,475,000.00	23,475,000.00	.....
Miscellaneous	60,896,496.00	.....	60,896,496.00	60,896,496.00	.....
Increased compensation to certain employees ($240 bonus)	35,000,000.00	.....	35,000,000.00	35,000,000.00	.....
Total, permanent and indefinite appropriations	1,335,776,360.87	.....	1,335,776,360.87	1,335,776,360.87	.....
Miscellaneous, including $18,600,000 for hospital facilities	.....	.....	.....	20,000,000.00	+ 20,000,000.00
Grand total, exclusive of deficiencies and including naval bill as passed by House	4,688,856,739.36	15,130,829.00	4,703,987,588.36	3,530,773,642.51	—1,173,213,945.85
Deficiencies, 1921 and prior years	555,527,986.24	.....	555,527,986.24	275,256,005.21	—280,271,981.03
Grand total, including naval bill as passed by the House	5,244,384,745.60	15,130,829.00	5,259,515,574.60	3,806,029,647.72	—1,453,485,926.88

A Sane Statement of the Necessity of the Automobile

It probably is not necessary to argue the necessity of the automobile with an audience of men who create motor cars but Mr. Macauley has made such a straightforward argument that we suggest it as a model for your conversations. He discusses unwise taxes and methods of meeting them.

By Alvan Macauley*

"WE have in the United States more than eight million passenger - carrying automobiles. Practically every one is a luxury," said Chairman James W. Good of the Committee on Appropriations of the House of Representatives recently. He then proceeded to outline plans to impose a special tax of $500,000,000 a year on the automobile.

Secretary Houston of the Treasury, in his annual report for 1920, recommended special taxes on the automobile to run close to $400,000,000.

"Any man who can afford to run an automobile can afford to pay a stiff tax," is the slogan that went around the Capitol when the new Congress began hunting new sources of revenue.

So, from all sides in Washington, comes the demand that the automobile owner be marked down for special mulcting. He has money, is the claim; the fact that he is an automobile owner proves that he is spending it for luxury.

There is no question that the automobile owner should pay his full share of the cost of running the nation, according to his wealth. He has to do that, anyway. He, like all of us, pays income taxes, excess profits taxes, excise taxes, stamp taxes, property taxes, road taxes and all the other taxes. But this demand is to make him pay a special and distinct tax beyond that which is paid by other people of his own financial class.

It would be fruitless to raise the question whether this is fair. Taxes have to be raised, and since they must be collected from people who can pay them it is not always possible to assess them with complete abstract justice. Any tax system that has ever been devised, or probably that ever can be devised, will have serious weaknesses, and it is possible to offer a good argument against almost any of them.

Unwise Taxes

But it is usually possible and always desirable to settle the question whether a given tax is economically wise. Unwise taxes have an amazing and terrifying power to destroy progress and prosperity. The welfare of a nation is often as much dependent upon its tax system as upon any other one thing. Taxes which place a burden upon production, upon progressiveness, upon decent living, upon thrift—all these taxes have long since been proved unwise.

There was a time when England imposed a tax for every window in a house. It was a luxury, if you please, to have a window. But England has long since learned better. We have recently had vigorous and successful agitation against the excess profits tax, on the ground that it hindered and limited business. In general, the rule by which wise tax leviers guide their conduct is not to impose any burden, more than is absolutely necessary, upon activities or equipment which are in themselves beneficial to the country as a whole. In other words, the rule is that there shall be no tax burden laid on prosperity or progress.

It is obvious, from the remarks quoted, that more than a few men in Congress do not feel that in taxing the passenger automobile we will be making a levy on either progress or prosperity. They feel that they would be taxing a luxury—a very different thing. If these quotations are not enough, the attitude is very definitely shown in the list of articles offered by Secretary Houston for special taxation. This list included, along with the automobiles, such things as tobacco, musical instruments, chewing gum, toilet soap, perfumes, cosmetics. These, in Mr. Houston's mind and apparently in the minds of many members of Congress, have the same general value to the community as the automobile. So, if it can be shown that the automobile is not a luxury, then the plan for special taxation is self-condemned.

What Is a Luxury?

A luxury is something extravagant, something rather exclusive, something lacking in permanent usefulness and good only for the pleasure or ease that it gives. Undoubtedly there was a time when the automobile came under this definition of a luxury. That may, perhaps, have been true even up to five years ago. Certainly at that time automobiles were comparatively exclusive, for in 1914 there were in America only 1,700,000 cars as against the eight million which are running to-day. In those days the automobile was more or less a "rich man's toy."

No one who stops to see what is going on around him can seriously claim that the same situation has lasted until to-day. The very fact that there are eight million automobiles running shows that luxury has become a very every-day affair, or else that the automobile has achieved some place outside the luxury class.

During the last year, certain investigations have been made which for the first time have presented a clear picture of the actual status of the automobile in American life. These investigations were conducted by the National Automobile Chamber of Commerce, which sent to many thousands of automobile owners scattered throughout the country a questionnaire asking for their own statement of the place the automobile fills in their lives. These replies were carefully tabulated, and showed:

*President of Packard Motor Car Co.

That 90% of all automobiles are used chiefly for business purposes.

That 64% of all mileage run by passenger cars is for business purposes.

That the average automobile, including those cars which are used purely for pleasure purposes, has increased the earning capacity of its owner 56.7%.

Let us translate these figures into what they mean in actual life. If we assume that the car which is not used for business purposes is a luxury, then we have in America to-day 800,000 automobiles which can be considered luxuries—a large figure; but there are 7,200,000 which are not luxuries. To tax the "luxury" cars it will be necessary also to tax nine times as many cars which are not luxuries.

If we consider that all automobile mileage which is not for business purposes is a luxury, then there were run in the United States in 1920, on a conservative estimate, 25,920,000,000 passenger miles that were for luxury. But there were 46,080,000,000 passenger miles that were for business purposes.

Earning Capacity

Most startling of all are the figures in regard to the increased earning capacity of men who used automobiles. These mean that the eight million cars have added to the productive force of America the equivalent of four and a half million men. This is an increase of 10 per cent in the working power of the country.

Take the same figures from another point of view. In 1920 there were approximately two million passenger automobiles manufactured. These give the country, as long as they last, an increased productive force amounting to more than 1,000,000 men. Since they will last an average of five or six years, and some of them three times that long, the country benefits from their production by something over five and a half million years' work. There were at no time engaged in the automobile industry in all its branches, including the manufacturers of cars, of parts, of accessories and tires, in selling or in service, more than one million persons. So that the automobiles manufactured last year will give back to the country between five and six times the labor that it cost to make and maintain them.

It must be confessed that these facts surprised many men in the automobile industry who had believed that they realized the essential part that the passenger car was playing in modern life. But further analysis of the situation only increases the evidence of the situation.

For example, surveys that have been made by several different agencies agree that about one-half of all passenger cars are owned to-day by farmers. Even more important from the point of view of taxation is the fact that about two-thirds of all cars manufactured went to the farmers. So the bulk of the sales tax is being paid from the farms, by men who are seldom accused of indulging in luxuries.

Another class that has found the car invaluable is salesmen. There are no figures to show how many salesmen own or use automobiles, but if anyone will stop to think how many of the cars within his own knowledge are used by such men, he will realize how important a part of our selling organization the passenger automobile is.

Multiplies Doctors

Then, there are the doctors. More than one hundred thousand physicians in the United States are using automobiles. Their cars not only increase greatly the number of patients that they can reach, but they make it possible for the doctor to get to the bedside in times of crisis far more promptly than of old. This saves both life and suffering, but perhaps should hardly be counted as an economic factor. But the increased number of calls each doctor can make is a saving that can be figured in dollars and cents.

There is, also, the direct use of the car in public services. An example of this may be seen in the big telephone companies. The New York system keeps on hand more than 700 passenger cars for the use of its line men and "trouble shooters." Philadelphia has about 500, and so it is throughout the continent. National, State and City governments also are using thousands of passenger cars for various purposes.

Something of the way in which the car is making money by saving time for its owners may be seen from the following list, compiled from the questionnaire mentioned, which shows by classes the increase in capacity as a result of using automobiles.

Real Estate and Insurance	113%
Doctors	104%
Salesmen	103%
Clergymen	98%
County Superintendents	72%
Farmers	68%
Contractors	51%
Manufacturers	33%
Bankers (including rural)	33%
Merchants	25%
Lawyers	23%

These facts give us the first true picture that has been drawn of the place of the automobile in American life. In drawing this picture, everything except the dollars and cents value has been carefully excluded. This picture proves that the automobile to-day is no longer a luxury but a tool, that it is an essential part of modern industrial life. It shows what those who have watched it closely have known, that the glory of the automobile in the last five years is that it has ceased to be a "rich man's toy" and has become the common servant and companion of people of all classes.

It is clear, then, that the plan now before Congress is to tax not a luxury, but a tool. There is no question whatever that such a tax would decidedly limit the use of this tool and hamper the economic progress that we could otherwise expect from its aid. What will this mean?

Civilization can fairly be said to have begun when some savage discovered that by sharpening a crooked stick for a hoe he could increase his crop of corn without increased labor. From then until to-day civilization has progressed through making machinery that increases the productive power of the individual man without increasing the effort that he has to exert. Particularly, we have learned that the things which pay us most are those which save our time; and in our complex modern society the greatest of the time savers is transportation.

No one would think of putting a punitive tax upon railroad travel, although it is often for pleasure. Yet the automobile to-day is carrying a heavier passenger mileage than is the railroad. It is as a transportation agent, as a time saver, that the automobile is performing its great services and paying its immense profits to the people of America to-day.

These savings and profits are matters shown by statistics and are beyond dispute. But there are other economic services, giving high value, on which it is impossible to compile figures but which are just as definite and just as important.

The Greatest Service

The greatest of these, perhaps, is the service that the automobile is giving in making farm life more tolerable. It has long been known that one of the things that has

been driving young people from the farms, and that has now turned America into a country where the majority of its population is in the cities, has been the isolation and the dreariness of most American farm houses. The farmer's car is, first of all, a time-saving productive instrument, but in addition it has destroyed the distances and the isolation of the rural communities, and brought neighbors closer together so that with a car the farmer and his family can enjoy a neighborhood social life and the benefits of community life in a way that was never before possible.

In the second place, the automobile is definitely acting as an offset to the congestion of the cities. Scores of thousands of people of all classes have found in their automobiles, during the recent crisis, the answer to their housing problem. A glance at the map showing settlement around New York City indicates this. There have been almost no new traction lines built in the suburban area within the last ten years. A map of ten years ago shows a narrow strip of settlement, seldom more than a quarter of a mile on each side of the tracks, along these traction systems.

Workers' Cars

To-day the spaces between the systems have been filled or are filling rapidly. Men would not walk more than a quarter or, at the most, a half mile to the stations; their cars carry them four or five miles in the same length of time and in far greater comfort. The tremendous increase in New York's suburban population, with all that it means of relief in the congestion that would have occurred had these hundreds of thousands of families been poured into the actual limits of the city, and all that they now have in comfort, fresh air, sunlight and quiet, is distinctly due to the automobile.

Nor is this a benefit that is monopolized by the rich or even the middle classes; it is one that is shared and shared largely by the manual workers in all of our industrial centers. It was noted last fall, when the depression struck Akron, for example, that the great exodus of rubber workers from that city took place almost entirely in automobiles, in these cars they scattered to city and town and country within a radius of several hundred miles and found work in places where the depression was not yet felt.

Around Detroit we have seen the same thing in another impressive way. All through the country, within fifteen miles of the city, there have sprung up in the last few years literally hundreds of little groups of cheap houses. Many of them are mere two-room shacks. Some are more pretentious and a few are extremely comfortable six or eight-room cottages. Most of them have one feature in common—a garage.

Commutation

These are the homes of workers. Many of them they have built with their own hands, and during pleasant weather it is no uncommon thing to find on Saturdays and Sundays an entire family—father, mother and children—busily at work putting up their homes. Around the houses spring up little gardens and the men who have adopted the "flivver commutation" pour into the city in the morning along a dozen highways and pour out again at night. They have found fresh air, quiet, sunshine, cleanliness and health for themselves and for their children. And these are distinctly men to whom the payment of an extra tax will be nothing less than a calamity.

With many of the "rubber tire commuters," too, there is a saving in rent and in general living expenses. People who have put their housing problem on wheels, so to speak, and moved it out of town, certainly have far greater comfort and far more healthful surroundings than can be purchased in the city for the same money. Special taxation on the automobile will have a definite effect in limiting this movement, which is one of the most healthful and promising of modern times.

There is no need to dwell upon the social services that the automobile gives, of the kind that cannot be reckoned in cash; the fact that it provides healthful, inexpensive recreation for millions, that it puts the outdoors within reach of the city dweller and the city within reach of the country man, that it is a successful competitor of the dance hall and the pool room—these latter two being without doubt luxuries and, therefore, may be held to be justly taxable.

Who Will Pay

One of the questions to be considered in planning intelligent taxation has to do with what class of people will pay. Those who are urging heavy taxes on the automobile have assumed an answer to this question. They believe that it will be paid by those who can most easily afford it, that is, by the rich.

Of course, rich people have cars, but it is no longer true that the majority of cars in the United States are the property of wealthy people. The average retail price of passenger cars manufactured in 1919 was under $1000 each. It is obvious, therefore, that a great majority of motor vehicles in this country are not of the class of luxurious products which customarily go into the hands of rich folks.

There are, of course, high priced cars and there are considerable numbers of them. The total output last year of the various automobiles that fall into this class was between 3 and 4 per cent of the total output for the year. At first glance, it would seem reasonable to say that the owners of these are people who could very easily pay the heavy taxes proposed, but it should be remembered that these are the people who are already carrying the great bulk of the taxation of this country. At any rate, the other 96 per cent of the cars are in the hands of people who cannot possibly be considered rich or even well-to-do.

Tax on Production

So we find that in imposing the heavy discriminatory tax on the automobile, beyond the 5 per cent it already carries, our legislators are advocating exactly the kind of tax which economists agree has everything against it and very little to recommend it. They are advocating a tax upon production, a tax that puts a penalty upon thrift and business efficiency. It is a tax, too, on good health, on comfort and on sane recreation. It is distinctly not a luxury tax.

Moreover, it is a tax on progress. No one who's memory goes back twenty years needs any proof of what the automobile has done in bettering living conditions for the great body of the American people. No one with any foresight can doubt that this improvement is only beginning, and that if unhampered the automobile in the next few years will provide more comfortable homes and better living conditions for millions, in addition to continuing to serve as a powerful productive agent.

In the coming years the automobile will be the greatest factor in breaking up the fetid congestion of our great cities and toward destroying the isolation of the farm. It will be of the greatest possible help in bringing to people of all parts of the country in all walks of life an equality of enjoyment and opportunity in many of the most essential of those things that go to make up our American democracy.

It will do these things in proportion as it is not hindered. The proposed tax will definitely check all these beneficial tendencies and will set progress back just so much. Of course the tax cannot stop it. But it can do incalculable harm.

The Two Programs

Let us look for a moment at the two principal programs which have been offered for taxing automobiles. The first came from former Secretary of the Treasury Houston in his annual report for 1920, when he recommended that the following taxes should be levied:

	Million Dollars
A Federal License Tax (50c. per hp.)	100
A Tax on Gasoline (2c. per gallon)	90
A Sales Tax (10%)	200
A total of	390

Chairman Good of the Committee of Appropriations of the House of Representatives, who will have a powerful influence in framing the tax bills under the present Congress, has a much heavier program. He would levy:

	Million Dollars
A Horsepower Tax of	200
A Wheel Tax of another	200
And retain at least the present tax of	100
Or a total of	500

He has not yet stated whether he would tax gasoline according to Secretary Houston's proposal.

What this tax may amount to will be seen if we consider one of the cheaper cars costing, say, $500, having 24 horsepower and running 8000 miles a year on 15 miles to the gallon of gasoline. This would give the following:

Sales Tax	$50.00
Horsepower Tax (Mr. Good's plan)	24.00
Gasoline Tax	10.66
Wheel Tax (Mr. Good's plan)	24.00

This would make a total for the first year of $108.66, or more than 20 per cent of the purchase price of the car. It would make a yearly total thereafter of $56.66.

It is almost unthinkable that such a burden should be laid on a man whose only offense is that he owns a flivver, yet that is the proposal.

A 1-Ton Bevel Gear Rear Axle

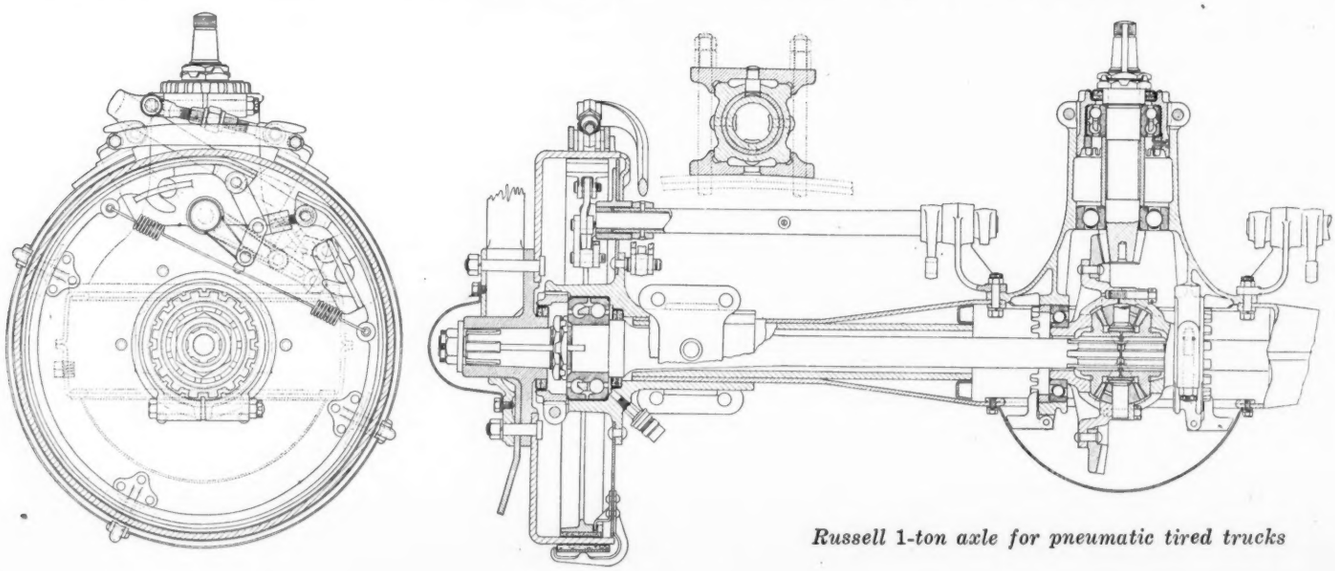
A BEVEL gear driven rear axle designed for use on pneumatic tired speed trucks of 1-ton capacity is manufactured by the Russell Motor Axle Co. The maximum load on the spring pads is limited to 4200 lb. The brake drums for both the inside and outside brakes are of 18-in. diameter, the brakes being of the full wrapping type. The inside brakes are actuated by a toggle linkage and the brake levers are conveniently arranged for inside hookup.

The axle housing is of 3/16 in. material, reinforced by a chrome nickel steel tube of 5/16 in. wall thickness. At the present time this axle is available with a gear ratio of 6 1/3:1, but other ratios can be furnished. Ball bearings of ample size are used.

The driving pinion, which is of the spiral bevel type, has six teeth of coarse pitch, insuring more than one pair of teeth in contact at all times, to enable quiet operation. The differential is of the four pinion type. Its gears and pinions are mounted upon the differential spider, which carries all of the load. The differential cases are free from any bending action caused by shaft deflection.

This axle has been designed strictly for truck use. The maximum torque input permissible is 9000 lb.-in.; that is, the axle can be used with a 4 x 5¼-in. motor developing 2100 lb.-in. torque, with a transmission reduction of 4:1. All parts are so designed as to be able to withstand the stresses created when the tires are slipped. These stresses are greatly in excess of those set up under driving conditions, even when the clutch is "dropped" in. Provision has been made for mounting either wood or disc type steel wheels on the axle.

THE two motor car routes which are being constructed from the Kilo goldfields, Northeastern Congo, to the Nile at Redjaf, and to Lake Albert at Kaseny, are said to be nearing completion. The latter road will facilitate the transport of heavy machinery to the mines, the output of which will, it is expected, be greatly increased when new plant can be installed.



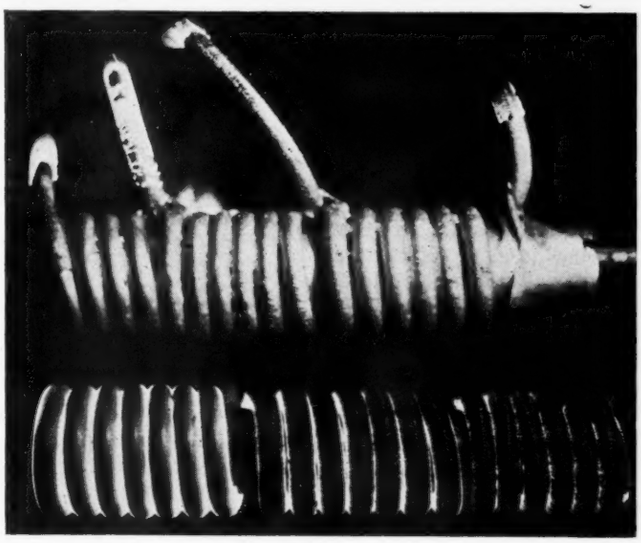
Russell 1-ton axle for pneumatic tired trucks

Cause of Cracking of Rubber Insulation on Ignition Cables

Tests at Bureau of Standards show that cracks are due to chemical attack on rubber by ozone formed as a result of electric discharge. Can be materially reduced by using braided cable and avoiding sharp bends.

EXPERIMENTS conducted at the Bureau of Standards by F. B. Silsbee and J. B. Dempsey show that the cracking at sharp bends, observed in the insulation of high tension ignition wires after service, is due to a chemical attack upon the rubber by the ozone of the electric discharge which takes place at the surface of the cable. This cracking does not occur if the insulating material is not under tension, or if the cable is surrounded by some medium other than air; but does occur even if the insulation is not subjected to electric stress, provided the atmosphere near the cable contains ozone. The extent of this cracking varies greatly with the insulating material used; and can be materially reduced by using braided cable and by avoiding sharp bends.

It appears from the experiments that cracking is produced in substantially the same manner, but somewhat more rapidly, when the samples are tested on 10,000 volts alternating current, than when tested on a magneto. The amount of the cracking is very materially reduced by the presence of a braid and is much less in material with Kerite insulator than in that with rubber. The cracking is entirely absent if the sample is left straight, or if no electrical stress is applied, or if surrounded by water or paraffin. The cracking is evidently a progressive phenomenon, requiring a combination of several factors, i.e., mechanical stress, electrification and the presence of air.



Corona on ignition cables on 1-inch arbor. Exposure to corona only fifteen minutes at 13,200 volts A. C. and to artificial light 5 seconds to show location of discharge
Upper mandrel from left to right: Kerite bare, mineral rubber, kerite uncovered
Lower mandrel from left to right: Kerite bare, kerite covered, mineral rubber

The theory of this action, which successfully explains nearly all of the phenomena, was originally suggested by Mr. Harris of the Kerite Company as follows: The electrification produces a brush discharge at the surface of the cable, which in turn produces ozone and oxides of nitrogen. This is shown by the noticeable odor after the endurance test has been run for some time and the visible glow surrounding the wires when in the dark. This glow is more prominent on the alternating current test. The accompanying photograph is taken with about 15 minutes' exposure at 13,000 volts. The electrical stress in the air at the surface of the cable, as computed from the dimensions of the wire and the dielectric constant comes out much in excess of the breakdown strength of air, and indicated that corona is to be expected.

It is well known that ozone actively attacks rubber; and when the rubber is under mechanical stress the products of the reaction are pulled apart, thus exposing at each incipient crack a fresh surface of rubber, which is in turn attacked. This effect doubtless is responsible for the fact that the action is localized in definite cracks when the material is under tension, but does not penetrate the material when the rubber is unstressed.

A possible remedy for this trouble would be to cover the cable with a closely adhering coating of conducting material, such as conducting paint or water soaked braid. This will prevent the tendency to form corona, as is shown in the photographs. It is, however, objectionable on account of the increase in the electrostatic capacity of the leads which results in a reduction of the maximum voltage produced by the ignition system and also because most forms of conducting paint are liable to crack and produce at the cracks an excessive amount of corona. The use of an insulator having as small a value as possible for the dielectric constant is advisable, as the voltage gradient in the air outside the cable is thereby reduced. There seems to be considerable difference in the rapidity with which different insulations are attacked chemically by the ozone. The ordinary impregnated braids help very materially in preventing cracking, probably because they are nearly air tight and prevent the ozone from reaching the rubber. After much bending, however, they will probably lose their efficacy. The importance of carefully avoiding sharp bends in the wiring is very obvious.

The experiments referred to in the foregoing are fully described in Technical Note No. 32 of the National Advisory Committee for Aeronautics.

A New Four-Cylinder Engine of Conventional Design

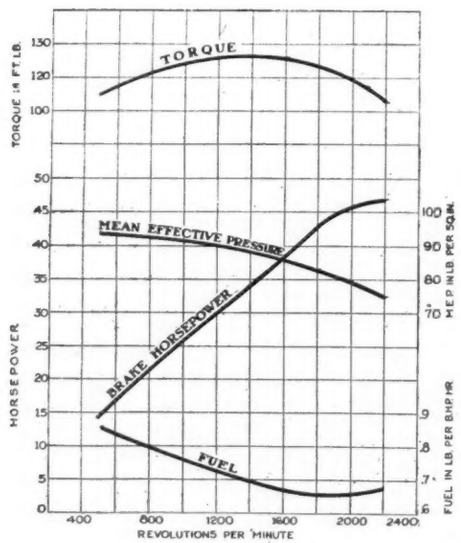
Is intended for passenger car or light truck applications. Four 3¾ by 5 in. cylinders develop a maximum of 47 hp. at 2200 r.p.m. Full pressure feed lubrication and ample water jacket space are provided.

By J. Edward Schipper

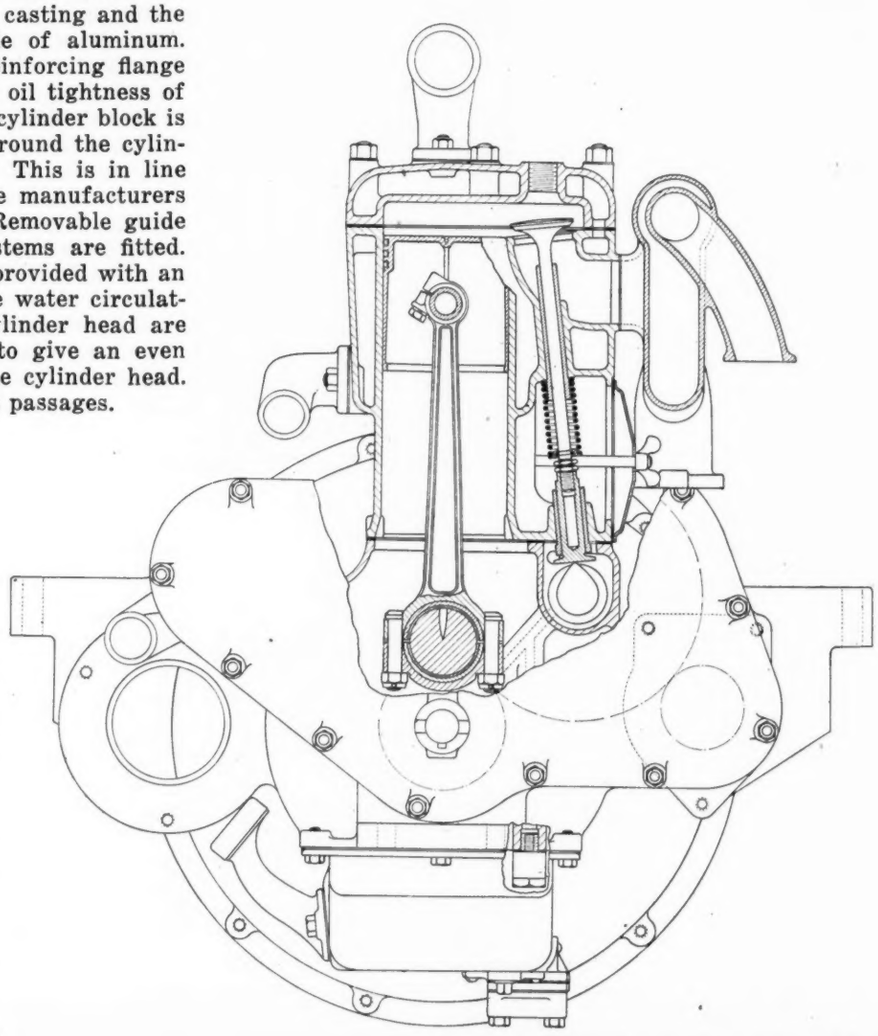
AMONG the engines recently placed on the market is one known as the Turmo. It is of the four-cylinder L-head type and is adapted for either light truck or passenger car work. It develops its maximum horsepower (47) at 2200 r.p.m., according to tests made at the laboratory of the Zenith Carburetor Co. The maximum torque is reached at about 1400 r.p.m. This new powerplant does not depart from established L-head practice, but differs from most of the stock engines of that type in that it has a full pressure feed oil system without splash.

The 3¾ by 5-in. cylinders are cast in a block of semi-steel. The cylinder head is a separate casting and the crankcase is also separate, being made of aluminum. The oil pan is pressed steel, with a reinforcing flange around the top for ease in maintaining oil tightness of the gasket. One of the features of the cylinder block is the extra large water space provided around the cylinder walls and around the valve seats. This is in line with a growing tendency among engine manufacturers to provide more liberal water space. Removable guide bushings for both tappets and valve stems are fitted. The demountable cylinder head is also provided with an unusual amount of water space and the water circulating holes between the cylinder and cylinder head are drilled instead of cored, which tends to give an even distribution of water to all parts of the cylinder head. The cylinder head has two water outlet passages.

Semi-steel pistons of the full skirt type are provided. The pistons are 4 in. in length and provided with three rings, all above the piston pin. Just below the bottom ring there is an oil-collecting groove and from this groove there are drilled oil holes to the top side of the piston pin. This insures oiling of the piston pin on the up-stroke. The pistons are finished by grinding. The piston pins are tubular steel, carbonized, hardened and ground. They are held stationary in the rods by clamping with alloy steel, heat treated bolts. To prevent the piston pins from working against the inside of the cyl-



Characteristic curves of new Turmo model H engine



Sectional assembly of four-cylinder

inder walls, a slot is cut in them through which the clamp bolt passes.

Drop-forged, .40 carbon steel, I-beam connecting rods are employed. These are 10 in. in length, center to center. The caps on these rods are held in position by nickel steel bolts with slotted nuts and cotter pins. The crankshaft is a three-bearing type, also of .40 carbon steel, heat treated and ground at the bearing surface. The crankshaft is 1⅞ in. in diameter. The bearing lengths are given in the table of specifications herewith. The crankshafts are all given a static as well as running balance and the end thrust on the crankshaft is taken care of by flanges provided at the center bearing.

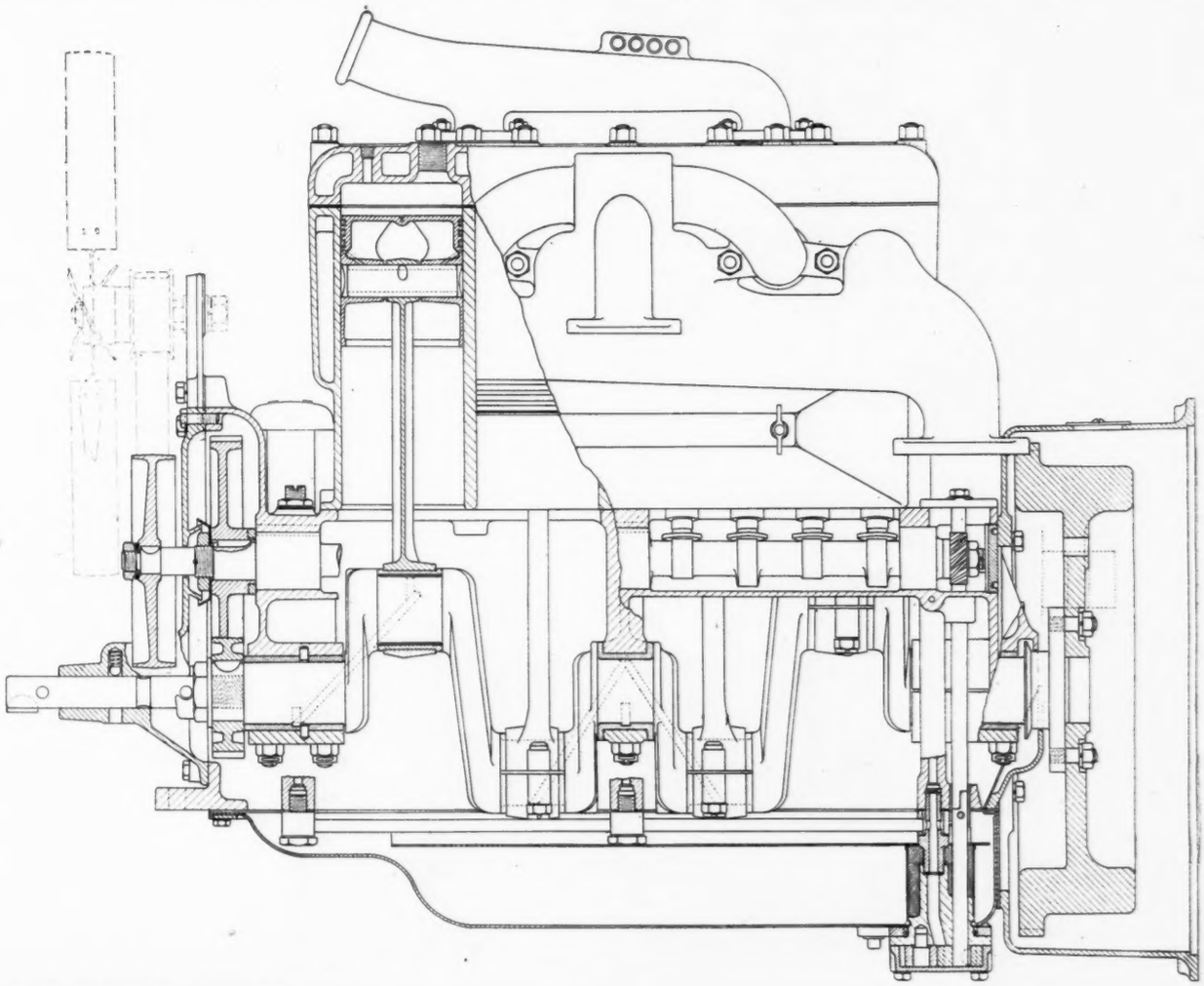
The integral camshaft is 1¼ in. in diameter, and is supported in three bearings. The camshaft and tappets are carried in a tunnel in the crankcase and are always submerged in oil. The three camshaft bearings are of cast iron, the shaft being hardened and ground. Camshaft lubrication is by the pressure system, which is claimed to result in particularly long life. The other bearings of the engine are of nickel babbitt. In order to obtain a good fit, the engine is placed on a special burnishing machine which removes all high spots in the bearings and gives a high percentage of bearing surface. Laminated shims are provided on all of the crank and connecting rod bearings.

Pressure lubrication is utilized for all of the engine bearings. The gear oil pump is attached to the bottom of the oil pan at the rear. The oil pump together with the oil screen can be removed for cleaning and inspection by the removal of four nuts. The pump is operated by a vertical shaft which is driven by gears from the rear end of the camshaft and the top end of this shaft also drives the distributor when one is used. From the pump the oil is carried through the three main crankshaft bearings and from the crankshaft bearings to the connecting rods through the drilled crankshaft. Leads are drilled in the crankcase from the main crankshaft bearings to the camshaft bearings. An oil relief valve

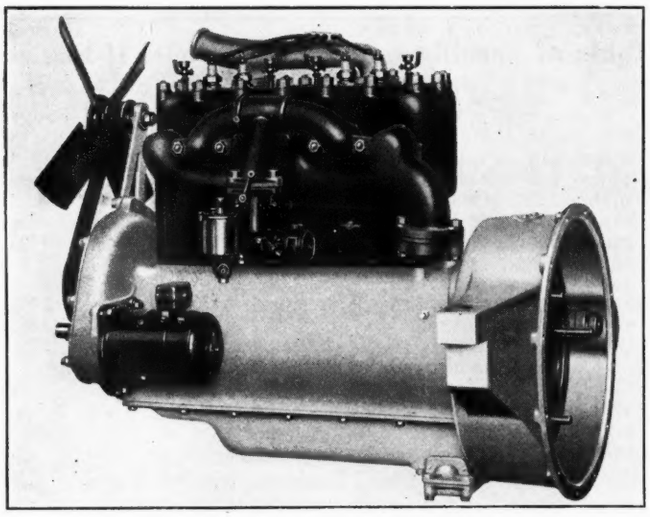
Table of Specifications Turmo Model H Engine

(All dimensions in inches.)

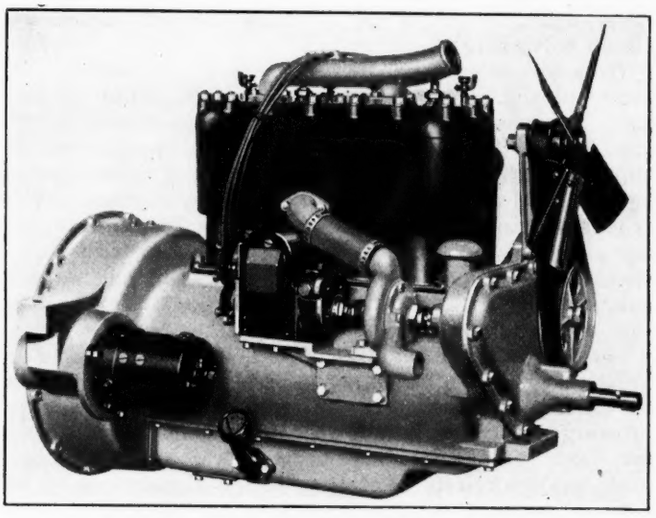
	Diameter	Length
Bore, 3¾ in.		
Stroke, 5 in.		
Number crankshaft bearings, 3.		
Number camshaft bearings, 3.		
Crankshaft front bearing,	1⅞	3⅛
Crankshaft center bearing	1 15/16	1¾
Camshaft rear bearing	2	3¼
Camshaft front bearing	1¾	2
Camshaft center bearing	2	1½
Camshaft rear bearing	2 1/32	1⅛
Piston pin bearing	1	2⅛
Valve outside diameter, 1 29/32 in.		
Valve clear opening, 1¾ in.		
Valve stem diameter, ⅜ in.		
Valve lift, ⅜ in.		
Carbureter flange, 1¼ in. S. A. E. 2 bolt.		
Weight of engine, 465 lb.		



L-head, 3¾ by 5 in. Turmo model H engine



Manifold side of Turmo Model H engine



Right side of Turmo Model H, L-head engine

for regulating the oil pressure is located at the front on the top side of the crankcase. The overflow from the relief valve lubricates the timing gears. The cylinder walls are lubricated by oil mist from the main and connecting rod bearings. The piston pins are lubricated by special oil grooves in the pistons, as noted above. An oil level gage is located on the right side of the oil pan.

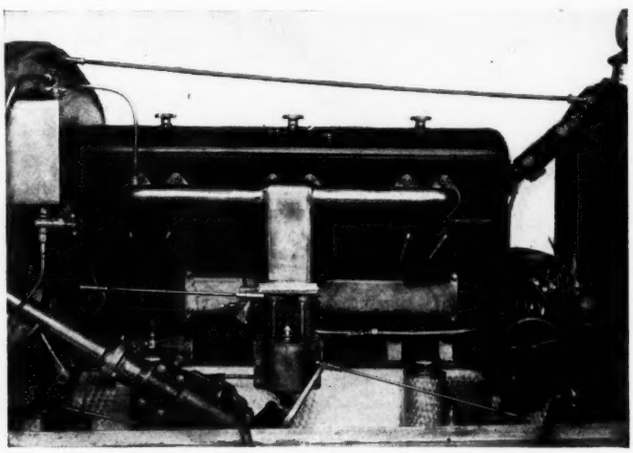
Practically all of the fittings used are S. A. E. standard. For instance, the generator mounting is the No. 1 S. A. E. flange type; the starting motor mounting, the No. 2 S. A. E. flange type, and the starter is fitted with an 11-tooth inboard Bendix gear. The distributor mounting is S. A. E. type B and the bell housing the No. 3 S. A. E. Any standard magneto can be fitted, the rotation being clockwise, looked at from the driving end. The fan is left hand and is driven from the camshaft. Either pump or thermo-syphon cooling can be provided. The engine is manufactured by the Turner & Moore Mfg. Co.

Racing Practice Employed in New Sporting Type Delage

By W. F. Bradley

A GUARANTEED speed of 80 miles an hour, with sporting body and full touring equipment, is given with the new sports type Delage just placed on the market. This car is not an entirely new job, for the standard touring car chassis is employed except that a new overhead valve engine is fitted. In order to keep the cost of production down and to simplify supplies, the old crankcase, crankshaft, connecting rods and pistons are used. The cylinder block is special, comprising six cylinders of 80 by 150 mm. (3.1 by 5.9 in.) bore and stroke, in one casting. For the first time use is made of a detachable head, in which are mounted two vertical valves per cylinder. These have a diameter of 42 mm. and a lift of 11 mm. The valves are mounted directly in the head without the use of cages, and unlike the touring model the intake manifold is external. Valve operation is by means of a camshaft mounted in the base chamber, pushrods carried through the cylinder casting and overhead rockers. The whole of the overhead mechanism is inclosed by an aluminum housing, and the compression cocks are carried inside this. Lubrication is on the same lines as the touring model, with the addition of a special lead to each of the overhead rockers. These latter are fitted with wicks which, after feeding the pins, carry the lubricant to the pushrod end of the rocker and then by the guides back to the base chamber. As on the touring model, a cross shaft drives the water pump and the magneto from its two extremities. A double magneto is used, however, and this fires twelve plugs mounted horizontally immediately below the intake valves, on opposite sides of the cylinder.

On the touring type Delage two independent carbureters are used. The sporting model has one Zenith dual carbureter connected up to the intake ports by a six-branch copper manifold, the vertical passage of which is heated by means of a by-pass from the water circulating system. Bench tests show 88 hp. at 2380 revolutions, and as a road speed of 80 miles an hour is easily obtainable with this number of revolutions, it is not intended to carry the power curve any higher. The Delage engineers believe that most purchasers of a sporting type car are satisfied with a maximum of 80 to 84 miles an hour, providing it is coupled with a wide range of power at low and moderate engine speeds. With the standard gear ratio of 3.1 to 1 the car will pull away easily on top with very rapid acceleration.



Carbureter side of new Delage overhead valve sporting type engine

Improvements in a Line-Driven Tractor

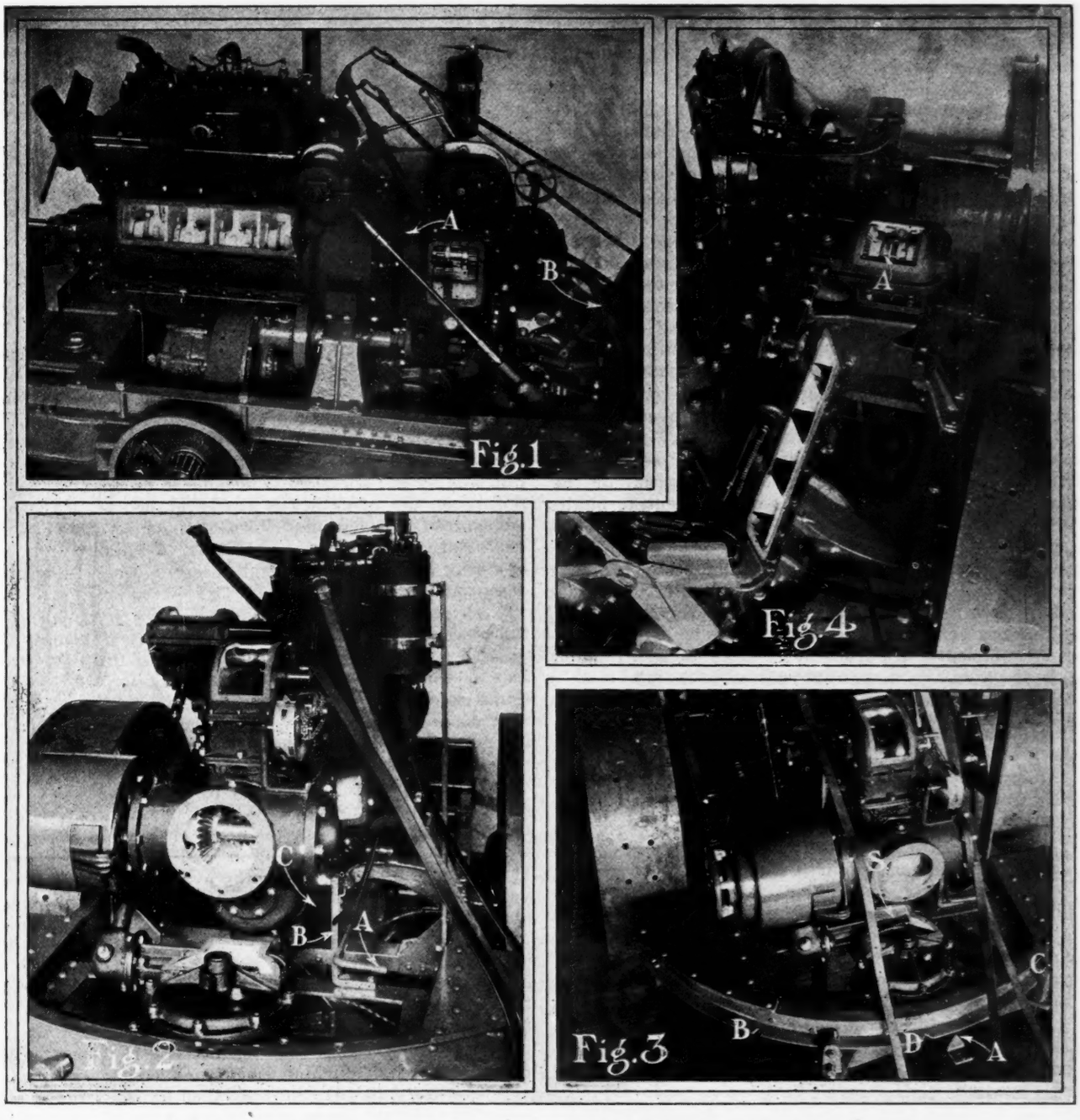
AT the recent Columbus tractor show two models of the Automotive one-man, line-controlled tractor were exhibited, one being a cut away model. Several improvements have been made in this tractor since last year, which are briefly described in the following.

The tractor is now provided with two sets of brakes instead of one, and the actuation of the brakes is somewhat different. The new brake is a belt pulley brake, and serves three purposes: First, to stop the tractor transmission immediately after the clutch is released; second, to stop the tractor when the transmission is in gear; third, to stop belt-driven machinery. The third object is accomplished by an extension from the two clutch operating lines to the driven machine and this feature is said to appeal very much to the user, as he can stop his belt-driven machine instantly without going to the tractor.

The belt pulley is connected with the engine clutch throw-out cam, so that the brake action follows the clutch action, and it is stated that gearshifting is accomplished with absolutely no clashing of gears. Fig. 1 shows clutch throwout cam A and brake shoe B. The brake rod and the pulley are not shown in this photograph, but the simplicity of the arrangement is apparent.

The second brake is now actuated by hand instead of by the gear shift lever as formerly, and is used to hold the tractor stationary when the transmission is in neu-

(*Continued on page* 817)



Views of the Automotive line-driven tractor, showing improvements made the past year

The Influence of Various Fuels on Engine Performance

This is the first of a series of articles describing what is believed to be one of the most thorough and important investigations of engine fuels ever conducted. It has been definitely proved that the tendency of a fuel to detonate is by far the most important factor in determining its value for use in engines. Power and efficiency not increased by use of "dopes." Proportions of aromatics, naphthenes and paraffins important.

By H. R. Ricardo*

IN the latter part of 1919 the author started extensive research work on hydrocarbon fuels, including a thorough investigation into the behavior of the working fluid in an internal combustion engine cylinder and the influence of the composition of the fuel upon its behavior.

Before any actual experimental work was started a careful analysis was made of the existing information with a view to indicating in what direction research was likely to prove most fruitful, and at the same time a preliminary investigation was made both as to the requirements which an ideal fuel should fulfill and as to the possible variations which might be expected as between fuels of different chemical composition.

The analysis of existing information proved, for the most part, somewhat disappointing; although much valuable data relating to the theoretical side were found, particularly in the publications of the Journal of the Chemical Society, and in various other scientific publications, the actual experimental data available proved to be of very little value. It was found, on close scrutiny, that the results would not agree among themselves; such data had to be set aside as unreliable. The outcome of this analysis was that, so far as engine test results were concerned, there appeared to be no information sufficiently accurate or reliable to be of much practical value.

After much thought it was decided:

(1.) To make a thorough investigation into the factors controlling detonation, since the tendency to detonate determines the degree of compression which can be employed, and therefore both the power and efficiency of an engine.

(2.) To determine accurately the total internal energy of each fuel when mixed with the quantity of air required for complete combustion, for when burnt with equal efficiency it is clear that the power output obtainable with each fuel is directly proportional to the total internal energy. It is well to emphasize that the internal energy has little or no connection with the heat value of the fuel, in terms of its weight.

(3.) To determine the losses due to change in specific heat and dissociation at high temperatures, and to ascertain how far these losses vary with different fuels.

(4.) To investigate the available range of burning of different fuels.

(5.) To investigate the factors controlling distribution and ease of starting.

(6.) To determine accurately the calorific value of different fuels.

(7.) To determine accurately both the self-ignition temperature and the process of combustion, when different fuels are ignited by adiabatic compression in a large cylinder.

Of these factors, it was already realized that the first was likely to prove by far the most important. It was known in a very general way that certain fuels, such as benzole and other members of the aromatic group, also alcohol, will not detonate readily even under very high compression pressures, and that detonation can be kept in check by the addition of benzole to ordinary gasoline. A fair amount of data was available also as to the phenomena of detonation. Very little information of a quantitative nature was, however, available, nor was anything known as to the influence of other fuels upon detonation.

With regard to (2), (3) and (4), very little information was available, at all events in a form readily applicable by engineers. Sir Dugald Clerk, Professor Hopkinson and other members of the Gaseous Explosions Committee of the British Association, had, before the war, made a very extensive investigation of these factors in relation to coal gas, but it has long been realized by many investigators that the conditions are widely different when applied to the volatile hydrocarbon fuels which contain no inert constituents. It is, of course, evident that any variation either in the total internal energy, in the losses due to dissociation and change of specific heat, or in the range of burning available, will influence very powerfully both the power output and efficiency obtainable, even with the same compression ratio.

With regard to (5), it is clear that the distribution and ease of starting must necessarily be dependent to some extent at least on the chemical and physical characteristics of the fuel, and it was clearly of importance to determine how far it was so dependent, and to ascertain what are the practical limits as to range of boiling point, vapor tension and other such considerations.

With regard to (6), the published data as to the heat value of different fuels were found in many cases to be contradictory and unreliable.

*Condensed from a preliminary report concerning extensive research work conducted by the author for the Asiatic Petroleum Co., Ltd., and published in *The Automobile Engineer.*

As regards (7), a somewhat elaborate piece of apparatus has been designed and constructed for research in this direction, but little data are as yet available.

Before proceeding to details either of the apparatus employed or of the experimental or theoretical results obtained, it will perhaps be well to outline very briefly the definite practical conclusions which have already been arrived at, and to deal later and in more detail with the reasoning and the experimental results by which they have been deduced and confirmed.

The general conclusions, expressed as briefly as possible, are subject, as such conclusions always must be, to minor qualifying conditions which will be dealt with later. With the exception of alcohol and certain other fuels, these conclusions can be taken as applying to all volatile liquid hydrocarbons practically available and all combinations thereof. Alcohol and other fuels containing oxygen atoms in the molecule differ in certain important characteristics, and therefore cannot be included without some reservations.

General Conclusions

(1.) It has been proved that the tendency of a fuel to detonate is the one outstanding factor in determining its value for use in an internal combustion engine. Compared with this, all other considerations are of secondary importance.

(2.) There appears to be little doubt as to the correctness of the view, now generally accepted, that detonation is less the lower the rate of burning of the fuel.

(3.) In all cases it seems that a low rate of burning is advantageous. No fuel has yet been found whose rate of burning is too low to permit of maximum efficiency being obtained in the highest speed engine yet tested.

(4.) Fuels capable of standing a very high compression will operate in a low compression engine as efficiently as those whose normal rate of burning is high—provided that there is a reasonable degree of turbulence in the combustion chamber.

(5.) Apart from the limitations introduced by detonation, the power output obtainable from all volatile liquid fuels, with the exception of the alcohol group, is the same at the same compression to within less than 2 per cent. Such variations as occur within this range are due rather to variations in the latent heat of evaporation than to any other circumstance.

(6.) Owing to the high latent heat and low boiling point of alcohol and certain other fuels, the weight of charge per cycle is greater and a higher power output is obtained in consequence.

(7.) The efficiency with which all volatile fuels, other than alcohol and the others previously referred to, are burnt is the same, at the same compression ratio, irrespective of rate of burning, provided the compression is low enough to avoid detonation under any circumstances. In the case of alcohol, the efficiency is very slightly higher, for reasons which will be considered later.

(8.) The useful range of burning is to all intents and purposes the same for all volatile liquid fuels.

(9.) The unavoidable losses due to dissociation and change of specific heat at high temperatures are substantially the same in all cases.

(10.) All the experimental results indicate that, with certain trifling exceptions which will be considered later, the performances of any combination of hydrocarbons as regards detonation, and therefore the power output and efficiency obtainable, is the mean performance of each of the components. The performance of any complex fuel such as gasoline can therefore be predicted, once the nature and proportion of its constituents are determined, or conversely, a fuel can be prepared to give any required performance, within the limits available.

(11.) No increase in power or efficiency has been found or need be expected from the use of "dopes." A large number of these were investigated and tested, but, as might be expected, the improvements in all cases proved to be practically negligible.

(12.) The highest useful compression ratio for, and therefore the power output obtainable from, any gasoline is governed by the relative proportions of aromatics, naphthenes and paraffins it contains—the smaller the proportion of the latter the better from almost every point of view. The influence of olefines has not yet been investigated.

(13.) To judge the quality of a fuel by its specific gravity is entirely misleading. If naphthene and aromatic fractions are present in any large proportion (as is sometimes the case), then a high specific gravity is a substantial advantage.

(14.) Owing to the very rich mixture delivered normally by pilot jets, and the still further enrichment effected by flooding, only a relatively small proportion of highly volatile constituents appears to be required for starting.

(15.) There is considerable evidence to indicate that in the case of most "natural" gasolines the more valuable constituents are those whose boiling points lie between the range 80 deg. C. (176 deg. Fahr.) to 180 deg. C. (356 deg. Fahr.). It is therefore often quite as undesirable to restrict the final boiling point of a fuel to 150 deg. C. as it is to permit it to exceed 200 deg. C. So much, however, depends on the actual composition of the fuel, and so great are the variations in this respect that this conclusion must be regarded only as a broad generalization.

The apparatus constructed or requisitioned for these experiments included:

(1.) A special variable compression research engine. This engine has been described in a paper presented by the writer at the British Association meeting at Cardiff and reported in full in Engineering of Sept. 3 and 10, 1920.

(2.) A research engine provided with means for supercharging the cylinder.

(3.) A special machine for determining the self-ignition temperature and pressure of fuels under adiabatic compression.

(4.) A single-cylinder experimental engine with crosshead piston, used chiefly for experiments on fuels of high boiling point.

(5.) Engines of various commercial types, mostly four-cylinder, used for tests on starting, check tests, etc.

(6.) Several motor cars of different types for road testing.

(7.) A miscellaneous collection of auxiliary apparatus.

It will be shown later that the standard of accuracy obtainable with both the research engines, and more particularly the variable compression engine, is exceptionally high; extreme variations extending over a year's running have been found to be less than 1 per cent, while the mean results obtained during any one group of tests can be taken as accurate in most respects to within one-quarter of 1 per cent.

The absolute accuracy of all the figures given later as test results can safely be accepted as being within one-half of 1 per cent, while the relative accuracy is about twice as high.

The accuracy of tests on the various commercial engines is not of a very high order. While the accuracy of observation is comparable with that obtained on the research engines, the mechanical and thermal efficiency of such engines is, for the most part, so low that varia-

tions in the efficiency or power output obtainable with different fuels are frequently completely obscured by much larger variations in the friction losses, distribution, carburation, etc.

Little was hoped for from road tests on cars, and indeed they proved to be practically valueless for indicating small differences. It was found impossible to assess and allow for the variations due to road surface, wind, tire inflation and many other variables, all of so large a magnitude as completely to mask any but well-marked differences.

It soon became apparent that the only conclusions of any value from road tests would be those drawn from the mean results of a large accumulation of data obtained from the behavior of many vehicles operating over a long period on each sample of fuel. Such a test was not practically possible.

One of the most serious difficulties which had to be contended with was that in many cases it was altogether impracticable to obtain chemically pure samples in sufficient bulk. It would, of course, have been desirable to use a pure light fraction—preferably of the paraffin series—as a standard basis of comparison, but to obtain a pure fraction, such as hexane, in the quantity required for calibration and check testing, was altogether out of the question. After much consideration it was decided to employ as a standard basis of comparison a comparatively light gasoline containing a fairly high proportion of paraffin fractions, and from which all, or almost all, of the aromatic members of the series had been removed by sulphonation. For this purpose the Asiatic Petroleum Co., Ltd., set aside some 5 tons of suitable gasoline and treated it by sulphonation until the aromatic content was reduced to less than 2 per cent. This fuel, which was used throughout the whole series of experiments, both for calibrating the engines and for comparative purposes, will be referred to in future as standard aromatic free gasoline. Its general characteristics are given in Table I, from which it will be seen that it consists almost entirely of members of the paraffin and naphthene series. Since the whole quantity was drawn from one tank and treated by sulphonation at one operation, it follows that its uniformity does not vary—a very important consideration in view of the fact that the research was expected to occupy not less than two years, and any change in the composition of the standard fuel would have involved endless complications and the possibility of serious errors.

It was found that the minimum quantity of fuel required for any individual test was about two gallons, and this, of course, left no margin for retests or for checking discrepancies, such as are inevitable when working to within such fine limits. While every effort was made to obtain chemically pure samples of the various members of different series, it was by no means always possible to do this, and in several instances serious errors were introduced due to the presence of impurities in what purported to be chemically pure samples. Of the paraffin series, reasonably pure hexane was obtained in sufficient bulk to permit of extensive tests. Of the naphthene series, samples of cyclohexane, hexahydrotoluene and hexahydroxylene were obtained in sufficient bulk, but, although the first of these purported to be chemically pure, subsequent analysis indicated that it contained so considerable a percentage of paraffins and aromatics as appreciably to modify the conclusions drawn from the earlier experimental results. Of the aromatic series, samples of benzol and toluene of great purity were relatively easily obtained. The greatest difficulty was experienced in obtaining ethyl alcohol.

Considerations of the chemical and physical properties of ethyl alcohol made it clear, not only that it would prove highly interesting in itself, but also that its behavior might be expected to throw a good deal of light on several questions relating to other fuels, such as the very important one of the influence of the latent heat of evaporation. Fairly early in the course of the research the necessity for running tests on alcohol became evident, and means had therefore to be found for obtaining sufficient quantities of this most interesting fuel. The samples ultimately obtained proved to be of a very high degree of purity.

Of the olefine series no really pure samples have yet been obtained in quantities sufficient to run engine tests.

Of the sulphur compounds, both carbon bisulphide and methyl mercaptan were obtained in sufficient quantities, but the influence of thiophine has not yet been investigated.

With the other miscellaneous samples, such as ether, acetylene, acetone, etc., no difficulty was encountered in obtaining sufficient supplies of reasonable purity.

For the most part the impurity of the samples has not had any very important influence on the deductions to be drawn from the test results, but their presence has rendered the tests far more arduous, since it was necessary in each instance to determine the nature and proportion of the impurities present and to arrive by independent tests at their influence. Once these factors had been determined the influence of their presence on the behavior of the fuel as a whole could be allowed for.

The close agreement between the theoretical deductions arrived at by Messrs. Tizard* and Pye* and the actual experimental data has been throughout a very striking feature. The influence of sulphur compounds of low ignition temperature upon the tendency to detonate, and the somewhat eccentric behavior of heptane, have been the real surprises, while the very important influence of the latent heat of evaporation upon the power output obtainable was not appreciated at first, nor does it appear to have been realized by any other investigators.

Table I. General Characteristics of the Standard Aromatic Free Gasoline

Net calorific value (minus latent heat of the evaporation of the fuel)				19,080 B.t.u. per lb.
Latent heat of evaporation				133 B.t.u. per lb.
Specific gravity at 15° C				0.718
Chemical composition	Paraffin series			63% by weight
	Naphthene series			35% by weight
	Aromatic series			1.7% by weight
		Deg. C.	Deg. F.	
Engler distillation	Boiling below	60	130	1%
	Boiling below	80	176	16%
	Boiling below	100	212	49%
	Boiling below	120	248	72%
	Boiling below	140	284	85%
	Boiling below	160	320	93%

The series of tests may be divided broadly into two sections:

Section 1.—A series of comparative tests carried out on a large number of different samples of gasoline with an immediate view to determining the best mixtures for blending, and indirectly with a view to exploring and determining the most fruitful avenues for further research. This series was carried out during the earlier stages of the research, while the more accurate

*Who conducted the theoretical portion of the investigation.

and intricate apparatus was in the process of design and construction, and while the theoretical investigations were in progress.

Section 2.—A much more accurate and analytical series of tests carried out with apparatus designed specifically for the purpose, using pure, or relatively pure, samples of all the different ingredients of the various volatile liquid fuels, conducted with a view to

(1.) Checking and proving the accuracy of the theoretical determinations.

(2.) Ascertaining the individual characteristics of samples of each of the various leading groups and the influence of the presence of such samples on the performance of a composite fuel.

(3.) Determining accurately the influence of compression ratio, temperatures and pressure, upon the power output and efficiency of an engine.

(4.) Determining the influence of the addition of gases, both active, such as acetylene, and inert, such as nitrogen, CO_2, etc.

The tests, which are still in progress, have involved to date about 1600 hours running on the three engines set aside purely for this research and several hundred hours running in other engines on the test bed and on the road. So far over 8000 readings of fuel consumptions have been taken with various fuels or mixtures of fuels under various conditions as to temperature, compression, etc., etc.

In view of the large number of readings taken it is impossible to give actual individual results, except in the cases of certain more or less isolated experiments. For the most part, the curves and tables which will be given represent the mean results of many hundreds of readings.

Table II gives a list and the leading characteristics of the various samples obtained in sufficient bulk to permit of fairly extensive tests. Besides those given in this list, a large number of other samples of gasoline and a number also of relatively pure substances were tested, but these have been omitted here.

With regard to the various samples of gasoline, these are selected either because they are fairly representative or in some cases because they afford extreme instances either as regards their specific gravity, aromatic content, naphthene content, etc. The different gasolines include samples of well-known commercial gasolines of all grades, ranging from the lightest aviation spirit to the heaviest mechanical transport gasoline.

Of the so-called pure substances, the degree of purity is denoted by the figures in brackets.

(To be continued)

Table II.—Fuel Data for Some of the Samples Tested.

Fuel	Spr. Gr. at 15° C. (59° F.)	Engler Distillation, Per Cent, at 60° C. (130° F.)	80° C. (176° F.)	100° C. (212° F.)	120° C. (248° F.)	140° C. (284° F.)	160° C. (320° F.)	180° C. (356° F.)	Final[3] Boiling Point °C.	Final[3] Boiling Point °F.	Vapor Tensions 760 mm. Hg and 0° C. (32° F.)	Viscosity at 20° C. (68°F.) C.G.S. Units	Latent Heat of Evaporation B.t.u. per Lb.	Calorific Value, Exclusive of Latent Heat (Lower Values) B.t.u. per Lb.	B.t.u. per Gal.
Gasolines															
Aromatic free	0.718	1	16	49	72	85	93	..	...	...	..	0.004	133	19,080	114,200
"A" gasoline	0.782	..	..	15	54	83	96	..	164	327	28	0.005	142	18,450	120,200
"B" gasoline	0.723	4	37.5	79	99	..	..	..	126	259	86	0.005	140	18,890	113,700
"C" gasoline	0.727	..	11.5	47	79	92	98.5	..	160	320	54	0.005	135	19,000	115,000
"D" gasoline	0.760	..	..	13	66	89	97.5	..	166	331	18	0.005	132	18,770	118,700
"E" gasoline	0.719	2	14.5	43	71	86	96	..	170	338	70	0.005	133	18,970	113,700
"F" gasoline	0.704	1	27	65	86.5	94.5	..	..	153	307	68	0.004	134	19,130	112,200
"G" gasoline	0.750	..	7	24	47	67	81.5	91	210	410	44	0.005	...	.....	.....
"H" gasoline	0.767	..	..	7	55	83	94	..	176	349	17	0.006	145	18,790	120,000
Per Cent at		320°F. / 160°C.	356°F. / 180°C.	392°F. / 200°C.	428°F. / 220°C.	464°F. / 240°C.	500°F. / 260°C.	536°F. / 280°C.							
Heavy Fuels															
Heavy aromatic	0.885	8	30	50	65	77	90	..	275	527	..	0.007	136	17,900 (approx.)	132,000 (approx.)
Kerosene	0.813	..	22	36	50	63	76	86	300	572	..	0.010	108	19,000 (approx.)	128,700 (approx.)
		Boiling Range Deg. C.					Boiling Range Deg. F.								
Paraffin Series															
Hexane (80%)	0.685	40 to 88					104 to 190				45	0.003	156	19,250	109,800
Heptane (97%)	0.691	98 to 98					208 to 208				11.5	0.004	133	19,300	110,700
Aromatic Series.															
Benzol (pure)	0.884	80 to 80					176 to 176				26	0.006	172	[2] 17,330 / 17,302	127,600 / 127,400
Toluene (99%)	0.870	110 to 110 (approx.)					230 to 230 (approx.)				9	0.006	151	17,580 / 17,522	127,400 / 127,000
Xylene (91%)	0.862	84 to 143					138 to 289				..	0.006	145	17,800	127,800
Naphthene Series.															
Cyclohexane (93%)	0.786	80.8 to 81					177.5 to 177.8				27.5	0.006	156	18,800	123,100
Hexahydrotoluene (80%)	0.780	95.5 to 101.2					204 to 214				..	....	138	18,760	121,800
Hexahydroxylene (60%)	0.744	103 to 123					217 to 253				..	....	133	18,770 (approx.)	116,300 (approx.)
Alcohol Group.															
Ethyl alcohol (98%)	0.798	78					173				12	0.012	406	11,450 / 11,480	76,200 / 76,300
Methyl alcohol (purified wood naphtha)	0.829	..					..				..	.....	...	.....	.....
Acetone	0.798	56					133				..	0.003	239	12,350	82,000
Methylated spirits	0.821	..					..				..	0.010	454[1]	9,850[1]	67,500[1]
Miscellaneous.															
Acetylene	....	..					..				Gas	....	...	21,010	.....
CS_2 50% Aromatic free 50% (by volume)	0.994	..					..				..	.....	145	10,620	88,000
Ether (dilute)	0.735	35					95				185	0.002	(229)	(13,350)	81,700 (approx.)

NOTE.—(1) These figures are estimated from approximate composition.
(2) Where two values are given bracketed, the one underneath is the more recent, and is probably the more accurate determination.
(3) Final boiling point of gasoline is always a somewhat uncertain quantity.

How Current Practice in Body Design Differs from Earlier Practice

Changes are less rapid and less radical as industry becomes more stabilized. Great majority of purchasers are unable or unwilling to pay the large difference in price between open and closed body. Wider use of all-season top predicted. Many new models use cast aluminum step.

By George J. Mercer

BODY design is not, as in the early days, changing by leaps and bounds. Changes are slowly evolved in much the same way as chassis changes are evolved. Now any forward movement is consistent with the normal movement of a stabilized industry.

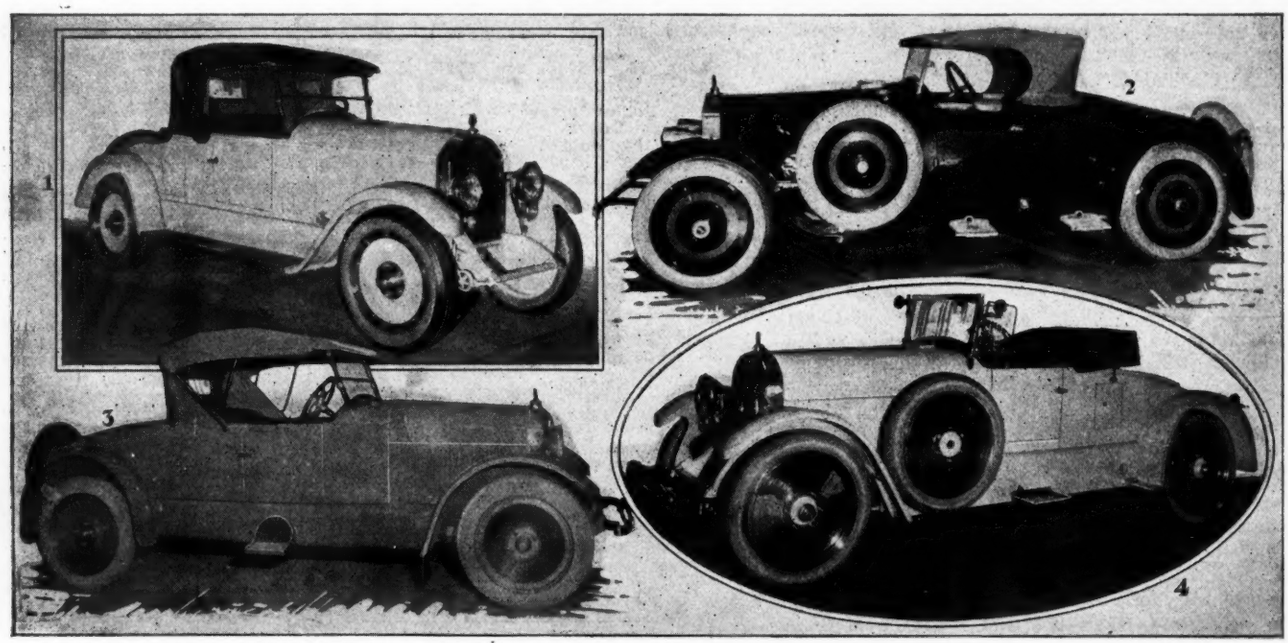
When changes are made they are generally confined to some one body model. The period that has just passed was based on the belief that the public wanted a closed car and were willing to pay for it. However great may have been the need for closed cars, the great majority of actual buyers are either not able or not willing to pay the difference and decide to purchase the open car. Hence prominence is given to the open models.

A general effort to make open cars more attractive is apparent. The runabout has been an uncertain factor for several years and has been made in sizes that ranged from the two bucket seats on a platform to a four-passenger that was virtually a touring car. This year's designs are neither extremely large nor small. In the new models the trick side, the folding seats and all combinations for carrying more than two passengers are eliminated. The body sides average as high as those on the touring models. The rear carrying compartment has been enlarged and covers all the space between the rear mudguards. The seats are low and seat-backs have plenty of slope, and as the body sides are high in relation to the cushion, the seats are, on the average, more comfortable for the driver than in any other body model.

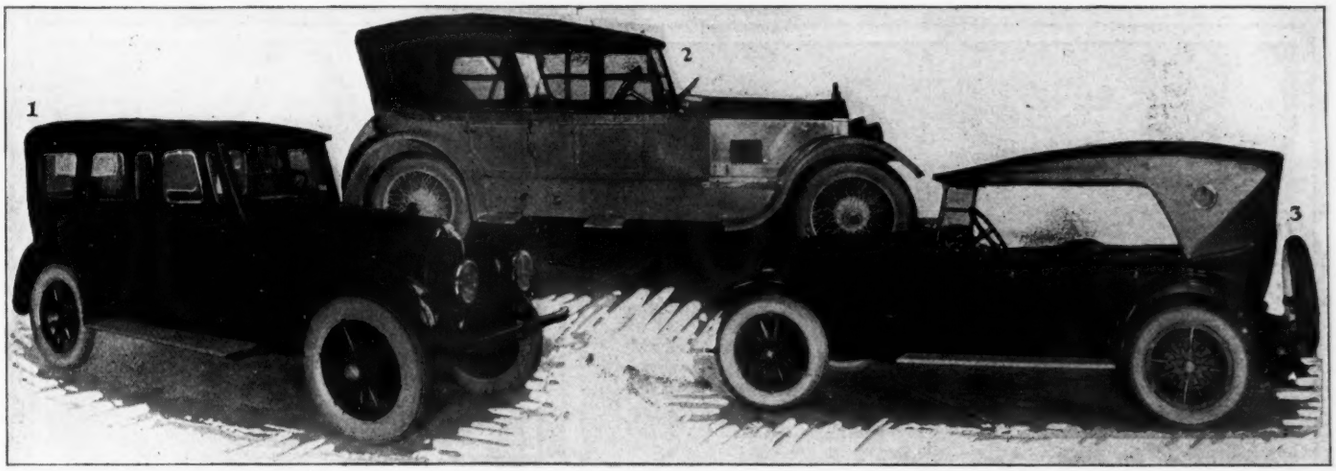
There is a tendency to show and use these cars with the tops up. This is in line with the current practice on other open cars. Many tops are snug-looking. The Cole, Roamer, R. & V. Knight and Haynes runabouts here illustrated are good examples of present practice. Windshield wings are desirable when the top is up, as they help to deflect air currents which otherwise pocket under the roof.

A rather radical change is in evidence on a number of open cars which have dispensed with the runboard and have, instead, cycle mudguards and steps. Disk and wire wheels are also quite popular. More makers are using disk wheels, and of these a number have the wooden disk type for the first time.

The touring bodies share equally with the runabouts in the addition of attractive features, but do not show



Four examples of up-to-date design in runabout bodies. (1) *Cole, with well designed top.* (2) *Roamer, with low good appearing top, striped disk wheels, etc.* (3) *R. and V. Knight, showing cycle type mudguard and cast step.* (4) *Haynes, showing windshield wings, side wheel mounting, disk wheels, etc.*



Three types of touring car tops. (1) *Holmes, fitted with Artcraft all-season top.* (2) *Roamer, with novel back curtain, and body with leather covered top edge.* (3) *Stephens, with semi-Victoria top.*

the same amount of redesigning. Most touring bodies are of conventional design, but brighter color combinations and an increased use of nickel parts is in evidence. The use of nickel on radiators is becoming quite general. Windshield standards also have the same finish in many cases and, where steps replace runboards, they are often cast in metal that permits the edges to be finished bright. Outside and inside door handles are the rule. Small cowl lamps are generally fastened to the base of the windshield post and these lamps, as well as the headlights, are often nickel-plated.

In some new models the bevel surface and the extreme straight line all the way through is being abandoned. The rounded radiator, hood and body shroud are of such height as to make these parts look large and substantial. When so made, they harmonize with the straight line on the top of the body, providing the body is of the flat-top type with slightly rounded outer edge. The tendency is toward this design, and it seems likely to become popular because the effect is pleasing and the manufacturing costs are not high.

The sport touring model, which has come in as a division of the touring type, has become well established. It is not required to be so comfortable as the larger touring body, hence the straight lines and angular surfaces will, on account of their advertising value, be continued longer on this type.

Much attention has been given the question of tops. The regulation touring top with emergency side curtains has reached a sensible state of development, but the need to converting the open body into a comfortable car for all-season use has necessitated the development of a top differing from the folding type.

The Artcraft all-season top, applied to the Holmes car shown in the accompanying cut, is a step in this direction. Other tops similar in appearance and apparently effective in securing the results desired are also being marketed. These tops are much superior in appearance to those designed heretofore for the same purpose. It is fair to predict, now that the time of inflated prices has passed, that competition will force the car manufacturers to incorporate this or a similar type of top as regulation equipment on one touring model.

Most of this year's touring bodies are of the five-passenger size. This, in fact, seems to be the size best suited for the majority of users. Seven-passenger models are, of coure, available, but they are not in the majority, as in previous years. In time the conventional type will probably be regularly equipped with some form of all-weather top, while the sport model will no doubt retain the lighter folding top.

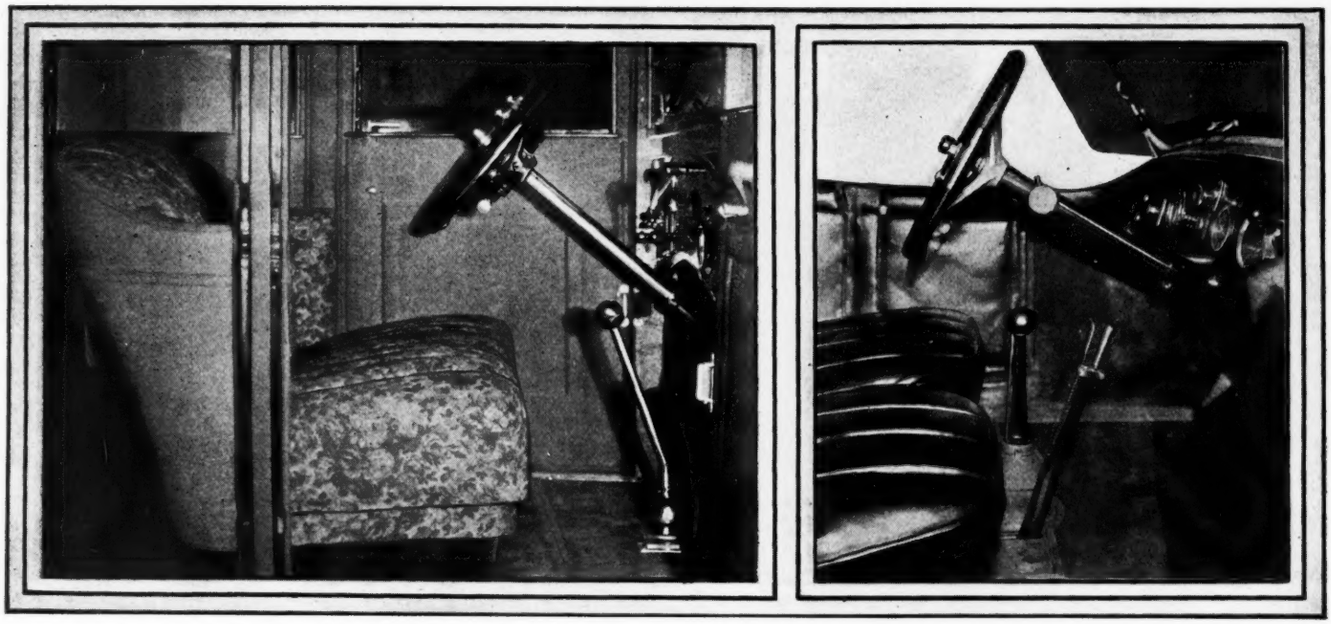
The top on the Stephens car, shown in the cut herewith, is an example incorporating the semi-victoria curtain with the back curtain, while that on the Roamer, shaped to come slightly around the corner, eliminates the gypsy quarter curtain.

The writer feels confident that the gypsy quarter will be superseded by the semi-victoria type. The objection to this type has been the cumbersome bulk that it forms when folded down, and the necessity of using a small triangular curtain to square the front up with the door curtain when the door opens from the rear. This latter objection can be satisfactorily provided for by making the triangle a part of the large curtain and simply folding it inward, buttoning it onto the bow when not needed. This eliminates a curtain that is irregular in shape, is not convenient to attach and adds weight in the curtain pocket.

The gypsy curtain has been used because it provides additional comfort by covering the quarter formerly left open. It leaves the impression that something is wanting, that part of the top is naked. The better appearance that the all-weather top presents when the side panels are removed, because the space above the seat is filled in, will, I believe, ultimately necessitate the use of a similar curtain on all tops.

The Roamer sport model has the unusual feature of a leather border about 5 inches wide entirely around the top edge of body. This matches the Spanish-finished trimming leather. This border extended across the shroud as far forward as the windshield and a flap buttoned tight at the base of tonneau windshield. In practice this may have the same objectionable feature as, at times, the flaps on doors have—that is, moisture collecting under the edges and running down in streaks. If fastened on with cement, this can be overcome and the effect made very attractive. Occasionally an entire car is covered with imitation Spanish leather, which, when well put on, is said to be durable.

In the touring, more than other body models, the rear must balance with the forward end of the car. This body is virtually a continuation of the hood and radiator, and, while a good low top with slanting windshield helps greatly on the side appearance, the real test of a well-proportioned design is the three-quarter front view, as this is the one that emphasizes comparative proportions. We have had in the past such an extremely rounded side that it gave the impression of a barrel ready to roll over,



Two methods of locating brake and gear levers in such a way as to facilitate access to driver's seat from the right door. Left, Jackson, right Mercer

and then again there has been the bevel edge that is not parallel with the top edge of the body, making the car look as if it is nosing down. There is less chance of making inharmonious effects with moderately rounded surfaces, and, for that reason, when experimenting with new proportions the results are apt to be more satisfactory where such surfaces are used.

A bird's-eye view of the car should always show an unbroken, rounded taper from the dashline back to the center of the rear wheel. The straight line of the hood to radiator should be tangent to this curve. If the dash width is narrow, so that a reverse curve must be used, the front has a "starved" look and shows something wanting. On the new runabouts the bottle-neck appearance which the extreme reverse curve gives is eliminated, for back of the seat these new bodies are now continuous with the body side, and fill the space between the mudguards, as well as being high enough to carry the body top line.

One real criticism of many of the touring models is that the seat does not look as comfortable as the old bodies, with higher sides and thick trimming rolls around the rear top edge. On the seven-passenger bodies, when the side heights were reduced, the extra seats prevented spreading out, and the height of cushions from the floor and slope of same was not proportioned to conform with the drop in the panel height. Now that the five-passenger body is the rule, there is no reason why the front seat-back cannot be set further toward the rear, the steering column be made a little longer, both cushions made with at least three inches slope and the seat-backs made to conform to the back of the passenger. The runabouts, as noted above, show a better average in this respect than most of the touring bodies.

The location of the front door on both open and closed bodies, to facilitate getting to the driver's side from the right, is important, as is also the position of the change gear and brake levers with respect to the front of the seat.

Two views, one on a Mercer and one on the Jackson, show how this has been provided for in different ways. On the Mercer both levers are short and work within a depression in the front of the seat and are sufficiently low to enable a man to slide over them. On the Jackson the levers are so well forward as to permit going behind them.

Trimming designs show little changes over last year. The French pleat is the style used, and the cushions are without facings. Black leather is used on seats and backs and imitation leather on the doors, back of front seats and other flat places of the touring and runabout models.

The commercial welt makes a neater finish on the doors and edges than was formerly the case with the home-made article. The usual number of bodies use fancy colored leather. These are always soft tones and in keeping with the color scheme.

The robe-rails are the strap kind. Very few use tonneau light or natural wood finish at the rear of front seat. Foot-rests are not considered as necessary as formerly. In fact, when the form of rear cushion is right, the need for foot-rests decreases. Instrument boards, even when of metal, are generally finished to imitate natural wood, but some few are dull black.

Mudguards show changes only when used with steps. At times these cycle guards come lower down at the front end than usual. The steps used are nearly always large and substantial looking and are generally cast of white metal so as to wear and finish bright. More lamp brackets than ever are fastened to the front guard with a tie-rod between.

The value of a high radiator was never more emphasized than this year. Changes in this respect made over last year are toward more expanse. The Pierce-Arrow is an illustration of this.

All the color combinations are sensible and, except in rare cases, the striping adds to the harmony. The disk wheel is an exacting unit in the color scheme. Striping on the disk must necessarily be a circle, and if this is overdone it gives the appearance of a target. Those that look best are of plain color, and, except in the white or yellow cars, the disk color is a lighter shade than the body. Aluminum painted rims better the appearance of the wheel.

Color combinations are similar to those used in former years, but there are more cars using the bright colors.

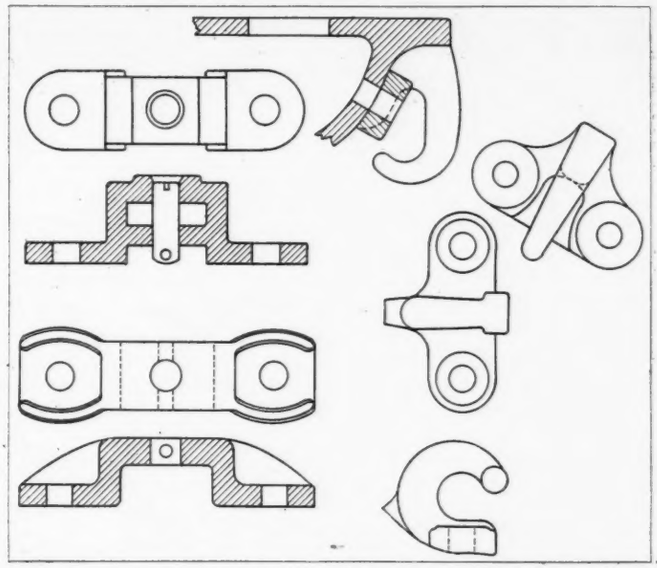
The blues, as usual, are most used, at times with white striping. The stripe just below the top edge of the body and parallel thereto is used less than a year ago. In a few cases this line is continuous from the body and on the hood to the front. When the hood is rounded, a continuous line from the body does not look right. One of the best jobs of striping that has come to our notice is a blue touring car with white stripes in each door panel about 1 inch from the door edge all round. The colors most used on closed cars are lake and black, maroon and black and bronze green and black.

Wool fabrics are used more than last year for trimming of the closed bodies. Many of these fabrics have a smooth finish and some of them a pin stripe. Fewer two-compartment bodies are used. Vanity cases are usually the small visible type and these are used on a minority of cars only. Cowl lamps are not used on the closed cars as much as the open types.

Skid-Chain Fastening for Cast Steel Disk Wheels

IN connection with an editorial printed in AUTOMOTIVE INDUSTRIES of Jan. 6 relating to lack of means for applying anti-skid chains to cast steel disk wheels, our attention has been called to the fact that the Clark Equipment Co., who manufacture wheels of this type, have long been providing such means.

The first steel disk wheels manufactured by the concern were for the Nash Quad. This was a single disk wheel, and 1-in. holes were drilled through the web of the wheel through which fastening means for the chain could be passed. There are several methods of fastening the chains when the wheel webs are thus drilled. The simplest method consists in the use of a bolt and nut. One end of the chain is then threaded over the bolt, the bolt is passed through the hole and the other end of the chain, and the nut put on. Nash and other manufacturers, however, use a special fastening. The bolt and nut method of fastening the non-skid chains is probably the quickest in operation.

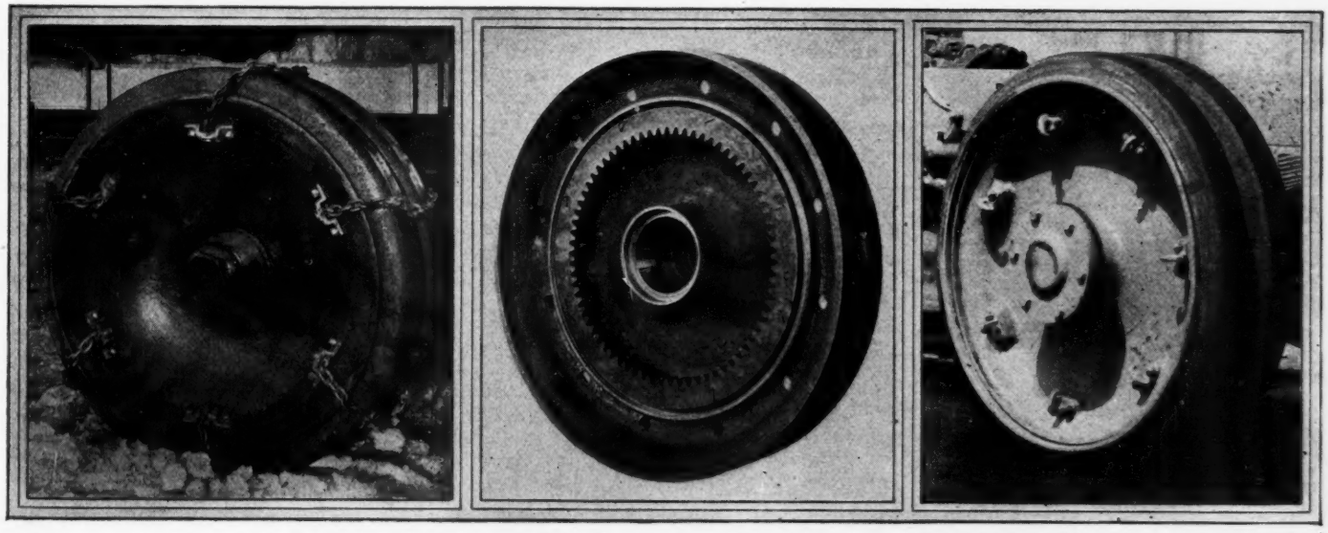


Methods of attaching anti-skid chains to cast steel disk wheels

On the larger double disk wheels of the Clark Equipment Co. with old style box section rim, the rims were drilled from the end. Several types of clamp have been designed by the Clark company and hooks are also used in connection with these wheels, the Titan Motor Truck Co., for instance, having designed a hook bolted to the rim of the wheel which it uses on its trucks. On a White truck used by the Clark company the clamps are bolted to the under side of the rim.

This box-rim type of wheel is now obsolete, however, having been superseded by the French type of rim. All wheels of this type made by the Clark company are cast with bosses on both sides of the web, through which holes are drilled. This permits of the application of any type of hook the manufacturer may desire. Some designs of wheels made by the Clark Equipment Co. and the hooks used are herewith illustrated.

The Engineering Subcommittee of the Empire Motor Fuels Committee, under the chairmanship of Dr. W. R. Ormandy, is conducting tests and experiments on the design and operation of internal combustion engines running on alcohol fuel and on alcohol-benzol-ether mixtures.



Cast steel disk wheels with provisions for fastening non-skid chains

Future Development of the Motorcycle in England

Two articles recently published in AUTOMOTIVE INDUSTRIES discussed the future development of the American motorcycle. It is interesting, in the light of those articles, to read this analysis of the English situation, written by a man who has closely observed the industry over there.

By M. W. Bourdon

IT has been suggested that the present type of motorcycle in England has reached a stage of gross overdevelopment, and that it will be necessary, in order to tap the wider market which awaits it, to strike out on new lines of general design.

Speaking broadly, the 1920 type of motorcycle in its elaborately equipped and highly powered forms has not been designed at all; it has been merely evolved from the stiffened-up pedal cycle of 1900 with a 1 to 1½ hp. engine attached to a cumbersome and unsightly projectile still exhibiting some of the most obvious failings of its forerunners. The whole efforts and ingenuity—one hesitates to say engineering ability—of its makers have during the past 20 years been directed mainly toward making it faster and a better hill climber by piling on more power, causing it to become a more and more unsightly entity from both the esthetic and engineering points of view. Subsidiary endeavors have been concerned with making it more reliable and, in some cases, more comfortable for the rider.

But in the way of protection for the rider and his clothing, ease of upkeep, certainty of lubrication, cleanliness of outline, simplicity of control, quietness of running, fuel efficiency and other features there is evident little if any improvement over the machines of the early years of the century—in fact, in some of these points it does not equal the earlier models.

There is an engineering saying, the truth of which is admittedly open to argument at times, that "when a thing is right, it looks right." But no man with engineering instinct will suggest that the present day English motorcycle satisfies him visually.

Take the average frame as an example. There is a great deal to be said in favor of the tubular construction with its rigidity combined with low weight; but as usually applied to motorcycles it is a mere conglomeration of tubes of various sizes and shapes, adapted or arranged mainly to fall in with the whims of the moment as to engine size and type, with additions or variations made apparently as afterthoughts to accommodate other components and accessories.

A development of the scooter; the Reynolds Runabout. Has a 2½-hp. two-stroke engine, seat platform on quarter elliptic springs, 24 in. x 2½ in. wheels, two-speed gearset, and chain and belt transmission

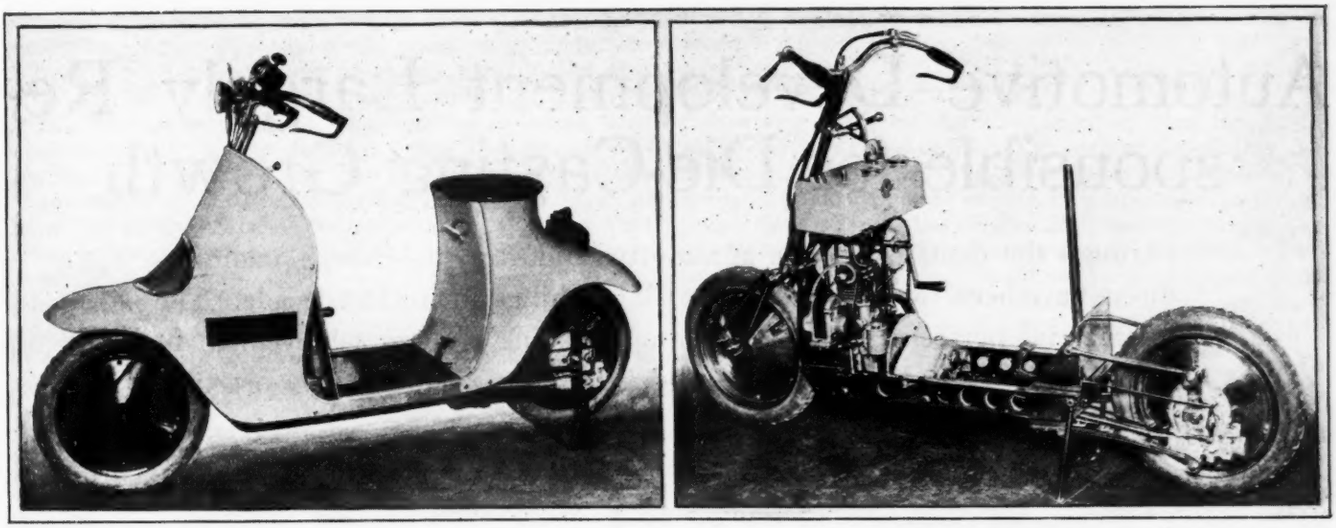
It has a tank of some nondescript shape clipped on here, a battery box with an outline that clashes with every other item strapped on there, a gearset bolted somewhere else and a multitude of control levers, wires and rods, oil pipes and fuel pipes, and the connections for other fittings running in every direction and at all angles with no particular shape or curvature.

"A mass of bits" goes a long way in describing a modern motorcycle, but to this should be added "exposed to mud, rain and the effects of vibration, and encouraging formation of rust and failure in operation."

No wonder is it that the best engineering and automobile firms and the brains they could apply with advantage to the industry have, most of them, refrained from associating themselves or allowing their names to be associated with motorcycle production in the past. There are signs, however, that such firms are now inclined to allow their resources to move in this direction. Among British firms, Beardmores have since the war taken interest financially and otherwise in the industry, and now we have Vickers undertaking the production of engines for an existing firm; whether the latter implies a Wolseley motorcycle in the near future remains to be seen.

British car manufacturing firms who have long been motorcycle makers as well, were nearly all originally pedal cycle makers (e.g. Rover, Humber and Sunbeam). Their motorcycle departments are run by men still connected with the pedal cycles and the atmosphere of the latter still prevails.

There are, nevertheless, clear signs that in the motorcycle industry there are brains in plenty; but they appear to be misapplied or at all events limited in their application. No maker of renown has yet seen fit, or has had courage, to get out of the rut into which motorcycle design has fallen. Post-war productions do not



The Unibus with its engine, mud shields and seat fitted. The addition of side panels suggests itself to afford greater protection for the rider

Unibus chassis has a pressed steel frame, 2½-hp. single-cylinder two-stroke engine, two-speed gearset, open propeller shaft and worm drive

depart from pre-war practice to any marked extent and then only in detail.

The piling up of "refinements" on the existing structure is leading nowhere and development where it occurs—as in the lightweight section—is mainly a matter of recommencing the circle.

All this leads to a consideration of possible developments, and in the writer's opinion—confirmed by that of men known for their breadth of view and associated with motorcycle production, though held in check by the interests they serve—the fundamental requirement is a fresh design of frame.

It cannot be denied that the existing type of machine appeals almost entirely to men below 40 years of age, the majority being enthusiasts below 30 who desire speed above all else. The sidecar combination certainly attracts men of small means, but they have to take a machine of the type produced for the speedman.

They would much prefer one which afforded them more protection and greater comfort, and did not necessitate the use of special overall clothing to keep them warm and clean. They really need an ultra-lightweight car on two wheels for solo work, and two seats for passenger work, either tandem fashion or with the second seat in a side attachment, and in their desires they have with them innumerable potential purchasers who will not at any price buy or use either a solo or sidecar on existing lines.

Such a new type of machine clearly necessitates a fresh design of frame, roughly a looped pattern with a low platform in front of the seat allowing the use of normal warm overcoats for cold weather riding.

The next requirement is more protection for rider, engine, transmission and controls from rain, mud and dust. This implies better mudguarding, a panel in front of the rider, partially enclosed engine, and a completely enclosed transmission.

Two machines at the Olympia Show contain the germ of the type in mind, so far as their general arrangement goes. These are the Unibus and the Reynolds Runabout, illustrated herewith. It is not suggested for a moment that these two machines as they stand are practical general purpose or touring mounts, but they appealed to many far-seeing men at Olympia as having very distinct possibilities for development.

The Unibus, in particular, is of interest in this connection. While it now has wheels far too small (16 in. diameter) and an engine also on the small side (2½ hp.), it has all the elements of a successful type. A general description of it is as follows: Pressed steel frame supporting the engine under a detachable hood in front with the clutch and gearset arranged car fashion in the frame; open propeller shaft drive to worm gearing alongside the back wheel, the latter connected to the frame by a pair of quarter elliptic laminated springs and a pair of parallel radius rods; two sets of expanding brake shoes within the worm wheel; articulated front forks with quarter elliptic springs almost parallel with the tubular members; a pedestal seat having below it a detachable hood forming the rear mudguard; a hinged panel in front of the rider gives immediate access to the engine. Through this panel projects the starting crank with chain connection to the clutch on the crankshaft. Both wheels are readily detachable and could easily be made interchangeable.

In the Reynolds runabout a simple frame of tubular construction, with duplicated and parallel side members, has two side arches between which the engine and transmission are located and on the top of which is a platform on quarter elliptic springs for one or two bucket seats. Engine and transmission are screened by detachable side panels and by a wire front to admit air, each side panel having a scoop to direct more air onto the cylinder. In this case a chain and a belt form the transmission. These could with advantage in some respects be superseded by a shaft and worm or helical bevels. Again, the wheels are easily detachable for tire repair and both engine and gearset can be removed from the frame without difficulty.

Both these machines sell at approximately £100 (say $500) at present. The first is being made by an airplane plant established during the war and the other by a quite small concern. Neither has yet attained any considerable output. Both machines could be made little or no heavier than a present-day motorcycle of similar power.

The rider's seat would have to be such as to afford him more "grip" of the machine for steering on rough surfaces and at speed. But there are the fundamentals for a new type, with the economy, reliability and most of the speed of the present day machine.

Automotive Development Largely Responsible for Die-Casting Growth

Through the demands of the automotive industry, die-casting manufacturers have been forced to do "impossible" things during last decade. The commercial perfecting of the aluminum casting is main achievement in this period. Here is a story of the development of die-casting practice.

DIE-CASTING owes its technical and commercial development to its contact with the automotive industry more than does any other type of casting or forging. The thirtieth birthday of the first die-casting plant has not yet been passed, but the manufacture of die-castings now reaches an annual production of about three million pounds a year. More than fifty firms are producing die-castings at the present time, although a large percentage of the total tonnage of the industry is produced by some five or six firms.

Though the die-casting industry is almost thirty years old, its growth was not uniform throughout this period. Die-casting manufacture was begun by H. H. Franklin in 1892, but the growth of the industry during the first twenty years of its existence was not nearly so rapid as during the last decade. During this last ten years die-castings came to be used extensively for automobiles and trucks, so that the die-casting industry was enabled to partake to the fullest extent of the benefits incident to the rapid growth of the automotive industry.

During the first decade of its existence, the die-casting industry was concerned with the production of castings for phonograph, telephone, cash register and similar parts, and it was not until 1904 that die-castings were used in automobile construction. H. C. Skinner, general manager of the Franklin Die-Casting Corporation, states that:

"As far as the writer knows, the die-castings were first used in the automotive industry on the Franklin automobile. The first die-cast part was a connecting rod bushing for the 1904 engine. This took the place of bronze, and the results were so satisfactory that bronze bushings were eliminated except in the case of the small end of the connecting rod."

The Doehler process came into commercial being about 1906 and since that time other firms have been organized, some dying after a short life, others still in successful operation. The progress of the industry as a whole, however, has closely paralleled that of automotive development.

Technical Phases

The general principles underlying die-casting manufacture are familiar to automotive engineers. The process may be defined as "metal castings made by forcing molten metal, under pressure, into a metallic mold, known as a die."

The types of die-castings manufactured readily divide into these classes:

1. Aluminum base alloys.
2. Zinc base alloys.
3. Tin base alloys.
4. Lead base alloys.
5. Brass and bronze.

The lead base alloys find a very limited use in the automobile industry, since the castings produced from these materials do not have the qualities necessary to make them suitable for extensive automotive use. The tin base alloys are used in making babbitt bearings, but their use is practically limited to such castings so far as automobile work is concerned. There is a very large tonnage absorbed by the automobile industry, however, for this purpose.

Before 1914, probably 90 per cent of the die-castings produced were of zinc base alloys. Since that time, however, the development of aluminum die-casting has made the zinc base castings of less importance. At the present time aluminum base castings constitute probably 30 per cent of the total die-castings production, zinc base castings about 22 per cent.

The zinc base castings are considered adaptable to such parts as magneto housings, switch locks, switch handles, self-starting devices, oil pump parts, speed indicators and windshield nuts. The tensile strength of zinc base castings often runs as high as 20,000 pounds, but at least one authority states that they cannot be depended upon for more than 10,000 lb. when used in any vital part.

The die-casting of aluminum became commercially possible about 1914. Experimental work had been going on for many years before this, but it was not until the beginning of the war that the process was perfected so that its use would be profitable in a commercial way. Since that time, however, the aluminum die-casting has become very widely used and now constitutes a large percentage of the total production of the industry.

The chief properties of the aluminum casting which give it popularity as opposed to the zinc base castings are:

1. Freedom from the crystalline, a structure which characterizes zinc base castings. This property makes the aluminum casting more permanent and more reliable.
2. Greater strength.
3. Lower specific gravity.
4. Higher melting point and greater resistance to varying temperatures.
5. Greater ductility.
6. Lighter weight for any given strength.

The disadvantage of the aluminum casting, of course, is its high price due to the greater difficulty in casting this metal as well as to the higher original cost of the metal itself.

Brass and Bronze Die-Castings

There has recently been some discussion between various die-casting experts concerning the possibility of die-casting brass and bronze in such a way as to make the product commercially practicable. Thousands

of dollars have been spent during recent years in attempts to produce dies capable of standing up under the relatively high temperature necessary to melt and cast brass and bronze. Charles Pack, production manager of the Doehler Die-Casting Co., states that it has been technically possible to produce brass and bronze die-castings for ten years, but that up to the present time no die material has been discovered which would withstand the casting process for a sufficient length of time to render production on a commercial basis economically possible.

In making this statement, Pack calls attention to the definition of die-casting as being "the production of metal castings by forcing molten metal, under pressure, into a metallic mold." Several of the well known die-casting companies are producing bronze castings at the present time, but by a pouring, rather than a pressure, process.

Aluminum bronze die-castings, however, are being produced by the Buffalo Bronze Die-Casting Co. by a pressure process, conformable to the definition of die-casting given above. This company claims to have found by long experiments a die material capable of standing up under the necessities of aluminum bronze die-casting production. Castings are being produced by this method for some of the best known automobile companies.

There are certain limitations to aluminum-bronze die-casting, however, according to T. W. Jeacock, president of the Buffalo concern, which are not experienced in connection with the aluminum casting. Certain intricate shapes can be cast in aluminum which are not yet possible in bronze. On the other hand, the bronze casting is specially adapted to parts requiring more strength than the aluminum casting can give. Moreover, this concern does not claim to be able to die cast all bronze and brass alloys, but simply an aluminum-bronze alloy.

The following list covers the aluminum-bronze castings which are being made at the present time by the Buffalo concern:

Windshield Parts: Sash Pivots, Upper and Lower.
Glass Retaining Clips.
Sash Pivot Clamps.
Sash Pivot Clamp Thumb Screws.
Sash Corner and Connecting Brackets.
Steering Arm Ball Sockets.
Shaft Lever Ball Sockets.
Gasoline Control Gears.
Spark Control Gears.
Spark Control Levers.
Gasoline Control Levers.
Instrument Board Brackets and Fixtures.
Door Handles.
Door Locking Bolts.
Door Hinges.
Door Strap Holder Plates.
Door Window Adjusting Levers or Cranks.
Door Strikers.
Hub Cap Latches.
Carburetor Body Plug.
Carburetor Float Balance Weight.
Carburetor Air Valve Cam.
Gas Tank Shut-off Handle.
Elbow Gas Tank Outlet Cock.
Elbow Oil Pressure Gage.
Chamber Plugs.
Cap Oil Pump Driving Shaft.
Battery Box Cover Dowel.
Worm Driving Gear: Teeth cast in Truck Driving Gear.

It has not been our purpose to enter into the technical details of this discussion, but merely to present to engineers the discussion itself, in giving a brief statement of the claims made by the various parties interested.

Influence of Automotive Industry

Not only has the automotive industry been largely instrumental in the commercial growth of die-casting, but it has influenced strongly the technical development as well. As the demands of the automotive industry became more varied, the die-casting manufacturers were spurred on to greater technical and research efforts and many times within recent years it has been found possible to die-cast certain pieces which had previously been considered impossible of manufacture by this method.

Rapid progress has been made during the last five years, yet it is the universal opinion among die-casting experts that the art of die-casting is still in its infancy. The die-casters have been able to do so many things recently that at one time they thought impossible that they hesitate to predict any limits for future possibilities.

There are certain rather definite limits, however, to the commercial possibilities of the die-casting art at present. These should be considered by the engineer in making up his designs and he should bear in mind that there is a real difference between technical limitations and commercial limitations. In other words, the die-casting manufacturers may be able, by the exercise of considerable ingenuity and some extra work, to die-cast a specially difficult part, but the cost will be in proportion. On the other hand, it might be possible, through a recognition of the limitations of die-casting practice, to simplify the design of that part in such a manner that its production would be cheaper and its fundamental characteristics preserved without essential changes.

Benefits of Consultation

The best results can usually be obtained if the die-casting manufacturer is consulted regarding production possibilities before the design is so far along that change of a specific part will necessitate major changes elsewhere. Practically all the leading die-casting producers are glad to render such service to customers or prospective customers, and regard it as an essential part of their merchandising policy. If they can make suggestions leading to a reduction in cost of the product, it is to their advantage since their percentage of profit is the same in any case, and the reduced cost means a satisfied customer.

The die-casting manufacturers can undoubtedly be of great assistance to the automobile designer if they are consulted in the early stages of design concerning parts which the designer would like to have die-cast. The die-casting manufacturers seem to understand fully and to admit frankly the limitations of their practice and for this reason are worth while consulting. One prominent executive of the die-casting industry said recently that "the die-casting industry has suffered from over-enthusiasm." Engineers have sometimes tried to get die-castings for parts not suited to this form of manufacture and the result has been unfortunate for all parties concerned. This sane view of their own industry is rather characteristic of die-casting manufacturers.

The advantage of the die-casting, of course, lies in the small amount of machining necessary, the rapidity of production and the adaptability to the manufacture of parts in large quantities. Die-casting limits vary from plus or minus .0005 in. to .0025 in. per inch of diameter or length. Bronze castings, made by the regular die-casting method, can be made in most cases to limits of plus or minus .002 in. per inch of length or diameter;

in many cases to closer limits, according to the Buffalo Bronze Die-Casting Co.

Die-Casting Output

General statistics concerning the die-casting industry are difficult to obtain, since there is no association of die-casting manufacturers. It would not be surprising to note the formation of such an association in the near future, although there is not an undivided sentiment in favor of an association among the various manufacturers. Approximate figures, however, based upon the "educated guess" of some man connected with the industry for many years give some indication of its size and growth.

If business had continued normal throughout the year the production of the entire die-casting industry for 1920 would have amounted to nearly 3,000,000 lbs. Of this total the percentage of each of the chief types may be roughly estimated as follows:

1.	Aluminum base	35%
2.	Zinc base	25%
3.	Tin base	27%
4.	Lead base	8%
5.	Brass and bronze	5%

This total of nearly 3,000,000 lb. for the 1920 output would indicate that the die-casting industry has multiplied about 10 times since 1913, before the war boom, followed by the increased demand of the automotive industry, enabled it to grow to its present proportions. In 1913 practically no aluminum die-castings were produced commercially, while to-day aluminum castings lead the field. The improvement of the process of aluminum die-casting to the point where it was commercially practicable accounts to a large extent for this enormous growth.

Making estimates on the basis of the approximate figures already used, it is possible to estimate the percentage of this output which is now absorbed by the automotive industry. Of the estimated output for 1920, approximately the following percentages went to the automotive industry. Of the output of

1.	Aluminum base die-castings	75%
2.	Tin base die-castings	90%
3.	Zinc base castings	50%
4.	Lead base castings	1%
5.	Brass and bronze castings	90%

Utilizing a weighted average on the basis of the figures presented, then, it may be said in a general way that the automotive industry absorbs about 67 per cent of the total output of the die-casting plants in this country.

To a very large extent die-casting may be said to occupy a special field. It comes into competition with the forging and the malleable and steel casting only in a few instances, since, with the exception of the bronze alloys, the very material from which it is made confines its use to parts where great strength is unnecessary.

Suggestions for Designers

As the die-casting industry has been so closely bound up with the automotive industry, in the past, so future developments bid fair to make closer that relationship as time goes on. Through the co-operative activities of the two, distinct advantages apparently lie ahead for both parties concerned. Some practical suggestions in regard to such co-operation are contained in a booklet issued recently by one of the prominent die-casting concerns. Under the heading, "Suggestions for the Designer," appear the following:

> "In designing for die-castings, there are certain points which, if borne in mind, will aid in their successful use.
>
> 1. In dealing with steel cores, as is necessary in a process producing finished parts, undercuts or recesses in the castings should be avoided. In many cases it is, of course, possible to use collapsible cores, but this increases the cost of both dies and castings.
> 2. To give added strength, pins, rings, and other bushings made from brass, bronze or steel may be inserted in casting.
> 3. No allowance for shrinkage or machining should be included in making drawings except where the limits are such that a special operation is desired, when it should be clearly noted.
> 4. Parts which require little or no machining after being sand cast or which can be economically produced by stamping or screw machine methods are not usually adaptable to die-casting.
> 5. It is cheaper to cast raised than depressed letters or figures, but both are practical.
> 6. Small fillets added at sharp corners greatly strengthen the casting and increase the rate of production.
> 7. The cost of die work can sometimes be reduced by our knowing the important dimensions, both where accuracy is required and where it is not essential.
> 8. The following limits should be borne in mind in designing for die-casting:
>
> (A) Limits—Maximum Weights for Casings.
> Aluminum—3 pounds.
> Tin Base—8 pounds.
> Lead Base—10 pounds.
>
> (B) Limits—Minimum Wall Thickness.
> Lead—1-32 inch.
> Tin—1-32 inch.
> Zinc—1-8 (on small castings 1-16 inch).

List of Automotive Parts That Are Being Made by the Die-Casting Process

Air shutters
Ball bearing retainers
Bearing bushings (crankshaft, camshaft, connecting rod, starter, generator, gear shift lever, clutch pilot, oil pump, shifter fork guide, speedometer drive shaft)
Bracket support (accelerator)
Brush holders
Body trimmings
Brush holder covers
Butterfly valves
Camshaft bearing cap
Carburetor float valve parts
Carburetor needle valve pointer
Carburetor float chamber cap
Circuit breaker parts
Foot button guide (accelerator)
Front axle yoke cap
Generator end plates
Gears for control mechanism
Gear cases (small)
Governor weights
Hub caps
Ignition distributor head
Instrument parts
Lamp bodies
Lamp doors
Lamp guard holders
Magneto bases
Magneto bearing plates
Magneto oil reservoirs
Motometer frames
Oil pump bearing caps
Oil pump gears
Oil pump bases
Pedal shanks
Piston pin retainers
Radiator caps
Rim lugs
Rotor hubs (magneto)
Radiator emblems
Switch levers
Spark coil heads
Spark and throttle levers
Spark and throttle sectors
Speedometer parts
Steering wheel spiders
Thermostatic devices
Tire brackets
Tire mould parts
Vacuum tank parts
Vibrator spring supports
Water pump housings
Windshield fittings
Wire control cable clamp
Wire wheel parts

Aluminum—1-8 inch (for small castings 1-16 inch).

(C) Possible Variations from Drawing Dimensions Per Inch of Diameter or Length.

Lead .....plus or minus .001
Tin .....plus or minus .0005
Zinc .....plus or minus .001
Aluminum .....plus or minus .0025

Where the distance involved is several inches these may sometimes be reduced.

(D) Maximum Number of Threads.

Lead, external .....24 per inch
Zinc, external .....30 per inch
Tin, external .....34 per inch
Aluminum, external .....20 per inch

In the case of aluminum, where close fit is required, thread should be cast oversize and chased.

Where economical, internal threads can be cast in parts made from zinc, tin or lead base alloys, but this is not possible in parts made of aluminum.

(E) Holes.

Lead, Tin, Zinc—1.32 inch minimum.

Regulated by depth of hole and thickness of casting.

Aluminum—3.32 inch minimum.

Size of hole is dependent on its length and the general design of castings. Holes not cast can usually be spotted to facilitate drilling.

(F) Draft.

Lead and Tin—Cores, .0005 per inch of length and diameter. Side walls .001 per inch.

Zinc—Cores .001 per inch of length and diameter. Side walls .001 per inch.

Aluminum—Cores .015 per inch of diameter and length. Cores less than ¼ inch diameter to have .005 per inch of length and diameter. Side walls .005 per inch.

While the above draft is desirable, it is sometimes possible to modify these limits where they would interfere with the service required.

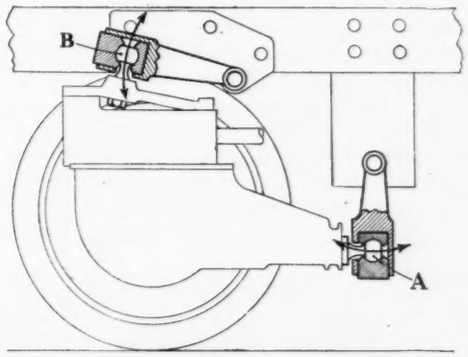
The accompanying chart comprises a composite list, made up from the suggestions of several leading firms, covering those parts which the die-casting manufacturers believe can profitably be made for automotive use by means of die-casting.

A Helical Spring Suspension for Motor Vehicles

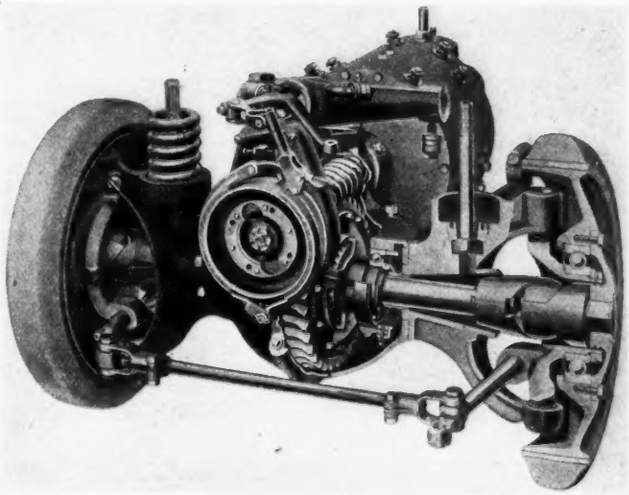
A NEW construction for taking up driving and braking strains is found in the Duplex compensating suspension for motor vehicles incorporated in the new series C Baker electric industrial tractors and trucks. The frame of these trucks and tractors is supported on double concentric helical springs providing the necessary cushioning effect, but the principle involved is adaptable also to other forms of motor vehicles with more conventional springing.

The helical springs referred to above are loosely mounted in pockets cast in the chassis and axle members respectively and support the chassis load only. Swivel studs, free to oscillate in their retaining sockets, hold the springs under proper compression when the vehicle is light, and resist the tendency of the chassis to rebound off the springs when traveling over a rough surface. These spring studs, thus tying together the chassis and the axle, are free in their seats within limits fixed by the torque resisting devices.

Referring to the drawing, the forward torque member, supported in trunnions from the chassis frame, takes all driving strains through a large ball and socket A attached to the motor supporting cradle which forms an extension of the axle housing. A second similar construction B, mounted in a horizontal plane above the power unit, holds the axle in alignment and resists all axle thrusts resulting from forward or backward motion.



Baker R. & L. duplex compensating suspension



Baker R. & L. industrial truck axle

Improvements in a Line Drive Tractor

(*Continued from page* 803)

tral, as for belt work, and stopping on grades. The operating lever A, Fig. 2, is held by spring clips on its quadrant B in both the on and the off position. The brake drum C is still mounted on the universal joint just behind the front drive axle.

As an aid to the operator the tractor is now furnished with a steering indicator A, Fig. 3, and notches B, C and D to indicate the extreme steering range and the straight ahead position. This enables the operator, who always drives the tractor from the implement seat, to steer rapidly and accurately.

The steering clutches A, Fig. 4, are now plain cones, metal to metal, instead of the expanding ring type, in order to eliminate the need for adjustment for wear during the life of the clutches.

The photographs show clearly the essential parts of the mechanism, namely, the steel steering worm with its bronze gear (at S, Fig. 3), the cam arrangement for gear shifting (at A, Fig. 1), the steering clutch assembly (at A, Fig. 4), the transmission, the Torbensen tractor axle, and the five bearing crankshaft in the Hercules engine.

Machining Cylinder Blocks on Drum-Type Continuous Miller

HERETOFORE the top and bottom faces of cylinder blocks have generally been faced off in horizontal milling machines with long tables to which a considerable number of the castings could be strapped at the same time. The illustrations herewith show a machine of the drum type specially designed for handling cylinder castings. This machine is quite compact, and it is also continuous in operation, loading of the drum going on while the machine is in operation.

One of the illustrations shows the milling operation on the top and bottom faces of the cylinder block and the other the same operation on the end surfaces of the block. By performing milling operations on opposite sides of a casting at the same time, one handling is obviated and the surfaces are bound to be parallel.

In milling the top and bottom of the block, two small cutters are used for roughing and one large cutter for finishing. The two small cutters are not operating on the same section simultaneously. Moreover, the roughing and finishing cuts do not occur upon the same casting simultaneously.

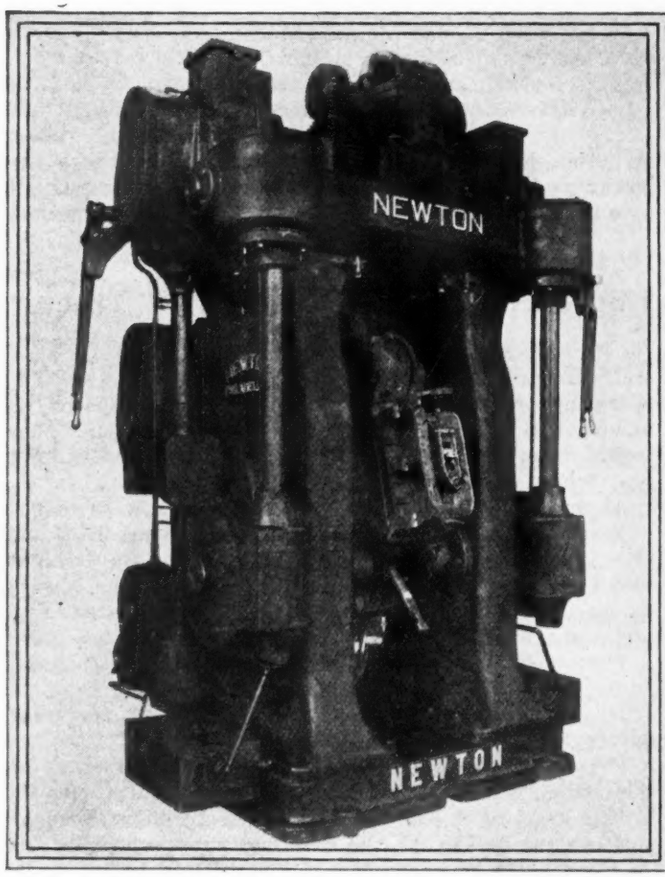
All spindles have individual adjustment and are driven by worms and worm wheels, the cutting speed of the finishing cutters being 20 per cent less than that of the roughing cutters. Different cutter speeds can be obtained by means of pick-off gears. The drum is rotated by herring-bone gears and worm and worm wheel, and its speed can also be changed by means of pick-off gears. The drum spindle is of the double taper bearing type, with very fine adjustment to prevent end motion. The other bearing of the drum spindle is provided with a take-up bushing of the split taper type.

All gearing, splined shafts and revolving parts are inclosed and run in a bath of oil. There are oil reservoirs on both sides of the machine and oil is constantly circulated by means of pumps. All slow running bearings, such as the spindles, are provided with special means of lubrication, so they will not become flooded.

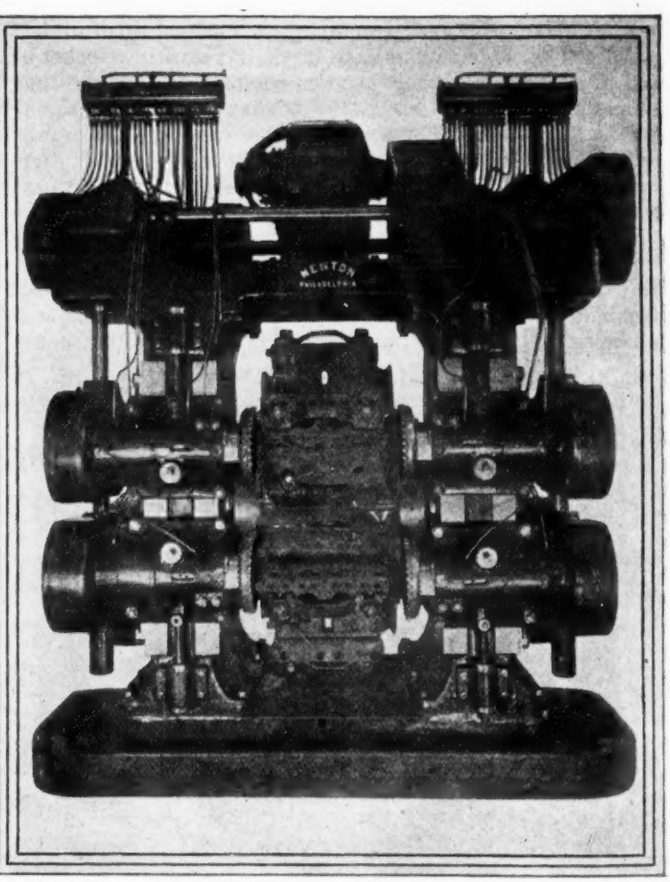
In chucking the cylinder block, use is made of a clamp with double bearing, which simplifies the handling. Machining the top and bottom of the four-cylinder block, as shown in the illustration, is accomplished at the rate of 25 per hour, in regular operation, we are assured. The rate of production in milling the end surfaces of the cylinder block, as shown in the other cut, is 35 per hour.

The advantages claimed for the method of cylinder machining here illustrated are that much floor space and much labor cost are saved. The machines are manufactured by the Newton Machine Tool Co.

THE announcement is made by the Secretary of the (British) Department of Scientific and Industrial Research that the Research Association for the Cast Iron and Allied Industries has been approved by the Department as complying with the conditions laid down in the Government scheme for the encouragement of industrial research.



Facing top and bottom of engine block



Facing ends of engine block

Exports of Automobiles and Tires for February, 1921

COUNTRIES	—Commercial—				—Passenger—				Parts	Tires—		
	Complete Cars		Chassis		Complete Cars		Chassis			Casings	Inner	Solid
Europe												
Austria	1	$ 520	...	$.....	2	$ 1,450	...	.....	$ 942	$.....	$.....	$.....
Azores and Madeira Is.	...	.....	...	.....	.....	.....	...	.....	13	.....	.....	.....
Belgium	...	.....	...	.....	11	24,198	...	.....	3,361	33,158	6,697	.....
Bulgaria	...	.....	...	.....	10	4,887	...	.....	.....	.....	.....	.....
Denmark	...	.....	...	.....	5	7,759	...	.....	44,627	12,148	36	150
Finland	...	.....	...	.....	4	5,490	...	.....	2,869	.....	.....	671
France	...	.....	...	.....	9	32,910	...	.....	30,852	30,250	12	.....
Germany	...	.....	...	.....	2	2,200	...	.....	4,168	300	12	.....
Gibraltar	...	.....	...	.....	.....	.....	...	.....	1,020	.....	.....	.....
Greece	4	7,922	...	.....	7	19,981	...	.....	8,992	4,540	130	.....
Iceland and Faroe Is.	...	.....	...	.....	2	2,700	...	.....	541	.....	.....	.....
Italy	...	.....	...	.....	2	7,000	...	.....	13,224	6,606	.....	.....
Malta, Gozo, etc.	...	.....	...	.....	9	3,744	...	.....	568	910	.....	.....
Netherlands	7	3,566	2	8,000	27	32,515	...	.....	34,029	11,679	5,525	.....
Norway	2	7,747	...	.....	10	16,158	2	$ 2,666	14,526	6,634	301	68
Poland and Danzig	...	.....	...	.....	2	3,329	...	.....	.....	.....	.....	.....
Portugal	...	.....	...	.....	12	31,094	...	.....	5,194	2,629	227	40
Roumania	...	.....	...	.....	3	11,500	...	.....	781	148	.....	.....
Spain	2	5,160	...	.....	50	106,292	3	3,207	78,966	27,363	5,271	2,391
Sweden	24	49,111	...	.....	38	52,986	...	.....	22,489	29,699	2,194	.....
Switzerland	...	.....	...	.....	9	20,352	...	.....	6,701	2,814	.....	.....
Turkey in Europe	...	.....	...	.....	1	2,646	...	.....	5,738	3,495	.....	.....
England	...	.....	21	38,500	6	13,448	12	14,318	409,356	89,193	8,740	3,143
Scotland	...	.....	...	.....	.....	.....	...	.....	953	.....	.....	.....
Ireland	...	.....	...	.....	1	750	...	.....	10,224	.....	.....	.....
Yugoslavia, etc.	...	.....	...	.....	.....	.....	...	.....	429	.....	.....	.....
North and South America:												
British Honduras	...	.....	...	.....	.....	.....	...	.....	863	265	78	.....
Canada	68	124,356	12	16,495	168	313,085	3	4,246	749,408	93,818	9,059	496
Costa Rica	...	.....	...	.....	.....	.....	...	.....	823	.....	11	.....
Guatemala	...	.....	...	.....	.....	.....	...	.....	3,244	4,870	1,052	408
Honduras	...	.....	...	.....	.....	.....	...	.....	4,560	754	96	595
Nicaragua	...	.....	...	.....	1	1,900	...	.....	2,379	1,303	1,022	.....
Panama	3	1,864	1	615	33	32,550	...	.....	18,377	23,386	1,781	747
Salvador	...	.....	...	.....	.....	.....	...	.....	639	2,327	579	.....
Mexico	209	293,153	12	26,729	452	339,822	...	.....	143,144	105,987	22,192	12,696
Newfoundland and Labrador	...	.....	...	.....	.....	.....	...	.....	2,947	97	29	.....
Barbados	...	.....	...	.....	9	7,580	...	.....	1,547	3,512	261	.....
Jamaica	5	10,348	3	1,289	28	18,038	...	.....	16,897	2,092	121	913
Trinidad and Tobago	...	.....	...	.....	1	1,500	...	.....	15,710	10,359	1,239	2,768
Other British West Indies	1	510	...	.....	1	433	2	4,400	9,885	2,601	305	231
Cuba	41	54,476	11	26,575	154	193,733	...	.....	308,981	59,055	11,072	16,697
Virgin Islands of United States	2	1,122	...	.....	1	510	...	.....	1,777	371	161	.....
Dutch West Indies	...	.....	...	.....	2	923	...	.....	1,433	2,045	287	.....
French West Indies	...	.....	...	.....	2	1,020	...	.....	9,392	.....	.....	138
Haiti	2	899	...	.....	6	6,000	...	.....	7,598	1,214	208	.....
Dominican Republic	...	.....	...	.....	2	2,163	...	.....	23,214	7,810	1,875	97
Argentina	6	18,097	4	10,127	128	191,515	5	7,008	104,964	109,478	8,917	2,278
Bolivia	...	.....	...	.....	1	2,536	...	.....	4,825	739	.....	.....
Brazil	2	15,395	...	.....	41	75,521	2	3,880	127,080	14,368	519	380
Chile	...	.....	...	.....	24	45,258	...	.....	27,014	6,471	1,059	623
Colombia	...	.....	7	10,854	4	6,394	...	.....	17,465	7,883	695	451
Ecuador	1	4,800	...	.....	6	4,945	...	.....	1,462	2,942	682	201
British Guiana	...	.....	...	.....	.....	.....	...	.....	2,444	3,908	390	.....
Dutch Guiana	...	.....	...	.....	.....	.....	...	.....	737	616	96	.....
Paraguay	...	.....	...	.....	.....	.....	...	.....	3,851	.....	.....	.....
Peru	13	10,050	9	13,587	7	33,378	...	.....	50,736	23,663	2,908	788
Uruguay	...	.....	...	.....	11	16,830	...	.....	14,600	23,367	658	.....
Venezuela	...	.....	...	.....	46	49,511	...	.....	10,489	7,021	923	.....
Asia and Far East:												
Aden	...	.....	...	.....	2	1,490	...	.....	381	2,520	300	.....
China	5	11,030	7	7,400	95	97,397	8	6,300	32,866	13,304	635	.....
Kwantung	1	3,600	...	.....	.....	.....	...	.....	80	.....	.....	.....
Chosen	...	.....	...	.....	.....	.....	...	.....	2,389	1,918	562	.....
British India	5	11,939	3	12,375	40	60,476	...	.....	117,239	26,949	6,432	18,332
Straits Settlements	20	47,467	29	80,206	72	104,722	...	.....	36,296	31	.....	3,475
Other British East Indies	...	.....	...	.....	6	6,000	...	.....	3,156	.....	.....	445
Dutch East Indies	62	175,501	53	128,047	154	243,790	...	.....	143,275	67,312	6,167	6,657
French Indo China	2	3,046	...	.....	12	11,400	...	.....	9,762	.....	.....	.....
Hongkong	5	18,586	3	4,000	13	15,015	...	.....	3,336	3,131	.....	102
Japan	31	17,400	51	16,550	63	91,257	103	44,612	87,900	3,996	1,000	500
Persia	...	.....	...	.....	.....	.....	...	.....	517	.....	.....	.....
Russia in Asia	...	.....	...	.....	.....	.....	...	.....	2,793	.....	.....	.....
Siam	...	.....	...	.....	15	19,263	...	.....	3,877	220	20	.....
Turkey in Asia	10	6,957	...	.....	26	33,990	...	.....	23,641	31,836	3,043	408
Australia	9	15,555	216	396,432	88	134,233	136	170,309	194,696	38,622	2,353	931
New Zealand	57	116,493	9	25,532	120	142,017	4	13,250	75,963	96,798	1,359	8,266
Other British Oceania	...	.....	...	.....	1	835	...	.....	475	.....	.....	320
French Oceania	...	.....	...	.....	.....	.....	...	.....	.....	67	.....	.....
Other Oceania	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	334
Philippine Islands	3	6,000	42	55,681	42	61,218	...	.....	89,289	68,348	8,987	21,978
Africa:												
Belgian Kongo	...	.....	...	.....	.....	.....	...	.....	1,126	.....	.....	.....
British West Africa	2	2,160	...	.....	7	10,920	1	400	24,404	52,506	7,023	.....
British South Africa	7	19,420	...	.....	42	58,093	4	7,015	103,890	17,969	4,235	1,730
British East Africa	...	.....	...	.....	10	12,632	...	.....	2,513	3,579	527	226
Canary Islands	1	1,351	...	.....	.....	.....	...	.....	2,497	3,107	25	.....
French Africa	5	2,598	...	.....	9	6,155	2	734	28,298	70	9	.....
Kamerun, etc.	1	449	3	1,046	2	841	...	.....	2,171	.....	.....	.....
Madagascar	...	.....	...	.....	.....	.....	...	.....	30	.....	.....	.....
Morocco	...	.....	...	.....	.....	.....	...	.....	1,243	.....	.....	.....
Portuguese Africa	...	.....	...	.....	8	7,305	...	.....	2,065	.....	.....	50
Egypt	3	4,048	...	.....	28	15,942	...	.....	41,301	2,369	32	.....
Total	622	$1,072,696	498	$880,040	2,205	$2,882,825	287	$282,345	$3,426,517	$1,248,540	$140,115	$110,724

Foreign Trade Financing Plan Makes Material Progress

Nine States have altered the banking laws to permit the banks within the State to invest in export trade funds. Credit to be apportioned in proportion to support in the financing plan. Other foreign trade information.

MATERIAL progress is being made by the Foreign Trade Financing Corp., the bank promoted institution, which proposes to establish a $1,100,000,000 long term credit for American manufacturers in foreign trade fields. An evidence of the advance made in this promotion is that nine states have changed their banking laws sufficiently to permit banks in those states to invest in this corporation.

The plan being worked out is that after $100,000,000 of stock has been subscribed, debentures will be issued for the additional billion dollars. These debentures will be sold to investors. The time of this credit will be sufficient to permit the foreign buyer to turn his goods into money. Also it will give time for the recovery of exchange values.

There is one very interesting point about the present plan of placing these securities which appears to be eminently fair to all concerned. The men who originated the plan of this corporation make no secret of the fact that the money made available to any industry will be in proportion to the financial support given by this industry. In other words, if the automotive industry wishes to avail itself heavily of the advantages of the long term credit arrangement provided by this corporation, it must support the organization of the corporation. The address of the Organization Committee of the Foreign Trade Financing Corporation is 66 Broadway, New York.

RECENTLY in an account of the spark plug sales in Argentina, AUTOMOTIVE INDUSTRIES referred to the Hauquaire plug. This name was taken from the Consular Report. The plug referred to was the Macquaire, a French plug.

Automotive Vehicles in Finland

THE fact that the car population of Finland had reached 1500 at the end of 1920 is related in a Commerce Bureau report by Consul Leslie A. Davis of Helsingfors, who states that two-thirds of these are in Helsingfors and that no other city has more than fifteen or twenty cars. The trucks in operation are given as 300 to 400, a larger proportion of which are used in the country and smaller towns.

During the first nine months of the year the imports of cars and trucks was 631, of which 100 came from the United States and the remainder from Germany, which, because of exchange conditions, is in a favorable position. American cars, because of their higher power, are said to be popular, the preference being for light seven passenger cars with six-cylinder engines, standard tread and wheelbase of from 118 to 124 inches. A high-tension magneto was said to be necessary equipment and the left-hand drive is desirable, although the German cars are being sold with right drive. A good truck market for both industrial and agricultural use exists in Finland, the Consul states, the demand being for a four-cylinder job from 1 to 2½ tons, equipped with pneumatics and the 1 and 1½-ton sizes.

Consul Davis added that there was a difficulty in obtaining import licenses, but that these were given freely, however, on parts of cars to be assembled within the country.

The exports of passenger cars from the United States to Finland in 1920 was 82, valued at $123,859, while 104 trucks, valued at $202,719, were shipped from this country.

Arabs Study Tractors

BAGDAD, in Mesopotamia, held its first agricultural tractor competition for fifteen days during January, with Austin, Fiat, Fordson and Saunderson machines as the principal performers. The trials were followed with great interest by the Arab farmers, who were very quickly converted to the advantages of mechanical traction and who placed orders for these machines without waiting for the final and technical results of the competition. The sight of these modern agricultural machines being driven and cared for by the natives was picturesque in the extreme.

The competition was carried through very successfully, all the machines doing good work. The trials were attended by the High Commissioner, Sir Percy Cox, by various ministers, and other officials, all of whom expressed their satisfaction at the results obtained.

TRACTOR trials will be held in Bulgaria this month under the direction of the Bulgarian Ministry of Agriculture. According to a British trade report, "a small, strong tractor, capable of dealing with rough ground and able to operate within confined spaces, is the type likely to meet with success."

Trucks in England

THE steady growth of motor truck traffic on British roads is shown by two facts of recent date.

First—The large and old firm of jam and food condiment purveyors, Crosse & Blackwell of London, are removing to a disused new five million dollar Government factory near Burton-on-Trent, whence they intend to deliver the goods by motor truck, of which they have made a preliminary purchase of over 150 vehicles.

Second—The big housefurnishing company of Maple's of London are starting a motor truck collecting and distributing service as a cheaper alternative to railway carriage of goods. More than 100 trucks are being employed as a start.

A development of this sort finds response in the railroad interests' seeking to attach to themselves control of the proposed road motor traffic services. Consequently, as there is legislation on the matter pending, feeling runs

high and automotive dealers are being asked to oppose the reported intention of the Government to entrust highway motor truck enterprise to the railways under the auspices of the Ministry of Transport. The latest reports are that the Ministry itself may be scrapped as being too costly for the present financial state of the country and probably as much, if not more, because of the drastic opposition to certain of its program by the rail and transport services at large.

British Automotive Trade

FIGURES for the foreign automotive trade of Great Britain in 1920, recently announced by the Bureau of Foreign and Domestic Commerce, show that 5325 motor cars and commercial vehicles, with a value of £3,929,455, and 3121 chassis, with a value of £2,474,877, were exported during the year. The comparison with previous years, as well as the totals for other automotive equipment, is given as:

	1913	1919	1920
	7,595	1,514	5,325
Touring cars and commercial vehicles	£2,396,369	£1,056,720	£3,929,455
	1,234	678	3,124
Chassis for motor cars...	£465,283	£471,585	£2,474,877
Motor cars, other parts...	£788,239	£1,068,627	£1,986,410
	16,850	8,368	21,304
Motorcycles and tricars..	£733,269	£577,343	£1,672,903
Motorcycles and tricars, parts	£217,330	£321,834	£667,654
Airplanes, airships, balloons and parts	£46,756	£712,784	£1,918,740

Service Competition In Britain

THERE is evidence of an increasing, not to say an accelerated, interest by British auto firms in service facilities. Among the factors responsible for this new zest are fear of the effects of American firms by contrast with British service methods, restricted number of paid drivers, and the increasing use of cars by business men for business ends. All this makes for recognition of the fact that the car—irrespectively of first cost—having the minimum of idle working hours is really the most useful and economical. Just now and for some time a section of the motor press has been discussing standard charges for overhauls, with the result only to expose the chaotic state of the issue and to concentrate attention on the absolute need for standard parts and good stocks of them available at short call.

As an instance of individual service enterprise may be noted the scheme just announced by the Hillman Company of Coventry, one of the smaller British producers of cars. This company is issuing with each car a specific guarantee against mechanical breakdown for one year and seven days from the date it leaves the works. Should a breakdown occur, the repairs may be executed by any competent firm selected by the owner, the bill being paid by the company. Further, the company will pay the owner $5 a day for the hire of another vehicle while his own is out of use up to 30 days. In addition every car sold will carry with it a full insurance policy against all ordinary risks.

These attractions are good in themselves, but they take no account of the cost of such repairs, and although it matters less to the user than it does to the makers what the cost may be during the first year of its use, the scheme makes no stated provision for the cost of repairs when they are usually first needed, namely, after (not during) the first year's use.

Another firm—the Austin Company of Birmingham—has thrown a bomb into the repairing trade by stating in its monthly house organ that its car can be "overhauled" by four men in one day (i.e. eight hours) at a cost of $30. To realize on British garage labor at present pay rates one must charge not less than $1 an hour all round, so that the above sum is quite inadequate, not to mention the ambiguity of the term "overhaul" as used in a connection which is probably meant to imply nothing more than internal cleaning, adjusting screw-adjustable parts, de-carbonizing the cylinders and a generally rapid survey of conditions diagnosed rather by the ear than by the vision.

N. A. C. C. Foreign Trade Policy

THE National Automobile Chamber of Commerce has recently published a booklet, printed in four languages, which is regarded as an international statement for the purpose and aims of the Chamber. The following excerpts from this booklet pertain to foreign trade activities of the Chamber:

"Realizing the growing importance of the automobile as an essential to international progress, the Chamber recently organized a Foreign Trade Department which functions under the directions of a Committee composed solely of manufacturers who are thoroughly conversant with export matters. Among the policies already advocated by this Committee may be mentioned the application to the United States Congress, for a lowering of the duty on automobiles imported into the United States from abroad. At present the United States duty is 45 per cent for automobiles costing at place of origin more than $2,000, whereas those of a lower value are assessed 30 per cent ad valorem. The enactment of a uniform tariff law of 30 per cent on all automobiles, regardless of value, was urged by the American manufacturers despite the fact that foreign manufacturers already enjoy special concessions because of exchange rates in their favor, the manner of determining the dutiable value of imports into the United States at the current rate of exchange rather than at the normal as was done prior to 1919, and the savings in customs charges resulting from the American practice of using the F. O. B. value of the imported product as dutiable basis rather than the C. I. F. value, which abroad mostly serves for such purpose.

"Appreciating that many foreign countries do not benefit in trade by a duty reduction on automobiles imported into the United States, especially if the exports therefrom consist of entirely different commodities, the National Automobile Chamber of Commerce has also urged the negotiation of reciprocity treaties which, by affording better marketing facilities for the products of the nations concerned, also offer assurance of mutual prosperity.

"A further aim of the National Automobile Chamber of Commerce is to promote the construction of highways. A special department is maintained to compile and disseminate gratuitously data on the most modern and economical methods of building roads not only in the United States but in foreign countries also. Because of this provision, governments or individuals abroad may be assured of a spirit of co-operation equally as spontaneous as that extended to those concerned with the solution of road problems in the United States."

Swiss Automobile Exhibit

THE date for the International Automobile Exhibition at Basle, Switzerland, has been fixed for May 28 to June 6. The showing will be made under nine classifications, which are: touring cars and chassis; lorries, tractors and other industrial automobile vehicles; automobile vehicles; agricultural machines and engines, industrial, aviation and motor boat engines; motor cycles and bicycles; parts for automobiles, engines, motor cycles and bicycles; wheels, rims and tires; tools and machines for manufacturing automotive equipment, and sports articles.

Constructive Possibilities of the Open Shop Movement

Intense bitterness has been engineered among many workers by the open shop movement. This has come about because they believe it to be an attempt to take away the power collective action has given them. The movement must be accompanied by fairness and patient understanding.

By Harry Tipper

TWO men were talking in the waiting room at the railroad station the other day. Evidently they had just finished their shift at work and were on the way home. Part of their conversation reached me and it was sufficiently interesting to get me to listen in without respect to the propriety of the matter.

The first man, the taller and quieter of the two, was talking about the new developments in the shop and wound up with a remark, which was the occasion of my attempt to hear the rest of the conversation. The remarks have been censored a little for obvious reasons.

"Yes, that's a fine proposition; they think they can put it all over us now because work is scarce. They talk about the American plan and all that bunk, but what they are trying to do is simply to throw us union fellows out. That's what they mean by the open shop."

"Sure," said the other fellow, who was more aggressive in his attitude. "Remember what Bill said about spies at the last meeting. Remember what happened to Bill a week later, when he was laid off. They said he was laid off because he was not a good worker. He was just reported and laid off on account of what he said at the meeting. Besides, didn't they lay off three men out of the tool room last week; and it's funny that all those three men were on union committees."

The conversation went on; it was pretty bitter and it was too emphatic to be censored readily, so that it could be included in any report of the circumstance. The remarks which have been mentioned were indicative of the attitude of these men and the point of view which they had on the open shop as far as their particular place was concerned.

I have stated a number of times in these articles that the open shop under proper conditions is the ideal arrangement for co-operation, but we are not dealing with the ideal in industry, and in most of the establishments the suspicion, the prejudice and the opinions on both sides are far from ideal.

The leaders of the unions are pointing out continually that the employers did not give up their own co-operative organizations, and in trades where the employers' organizations have been very active in fighting the labor organizations, a careful propaganda of information has been given to the workers concerning these activities. As a consequence, a great many of the union workers believe, like the two men who were talking, that the open shop movement is intended first of all to destroy the union and to fasten upon the worker the old control against which the unions have been fighting.

They believe that this is an attempt to take away the power which collective action has given to them, and a good many of them cannot speak about the open shop movement without displaying a bitterness which is not any less than that displayed by a good many employers.

Warfare is a poor way to secure co-operation and increased suspicion does not lend itself to the establishment of any unity. As the advantage is secured by one side or the other, that advantage is used only to press their control and their demands with the consequence that these demands become more and more incompatible and result in a greater division and a larger measure of disagreement.

Out in the Middle West one of the biggest plants in an industry which is very closely organized has been running a non-union shop for years, for more than the lifetime of the original workers. In that time this plant has not had a strike which assumed any serious proportions and no attempts to unionize the shop have succeeded, although some of the most skillful workers in the business are a part of the personnel of that organization. The owners of this establishment are known far and wide in the business as being on the square, as taking care of their working people and as thoroughly honorable in their dealings with workers. As a consequence, they have secured a family spirit and a unity within the organization which has not deteriorated in the growth of the establishment.

It is possible to make the open shop a valuable advance in American industrial organization, provided that it is accompanied by a spirit of patient understanding and of fairness which does not countenance any spy systems of information, any discrediting of union members because they are union members, or any unscrupulous advantage of the workers in rewards or conditions, because they are not organized into powerful co-operative bodies.

Wherever open shops have been established on this basis, they have succeeded in retaining the allegiance of their workers in the midst of strikes and through all kinds of adversity. This is not only true in this country, but there are some notable examples of this in Great Britain, where the organization condition is far more serious. If the open shop, however, is seized upon as a means of retaining the control of the worker and fighting the union without any desire or patient development of the ideals of fair play, the results will embitter the worker and in the course of time increase the strength of the various types of workers' organizations.

There is no other possibility. The manufacturer must be ahead of the union in his understanding of human nature, and what is involved in co-operative unity and har-

mony, or his objection to organization as it is at present constituted, will have no other effect than to increase its value in the eyes of his employees. There is very little discipline in employers' groups. Employers who have a sane knowledge of the fundamentals of human relations are harmed in their work by the aggressive and belligerent attitude of the man who sees in the present movement only the opportunity to recover control of his employees.

The short sighted manufacturer is the man who leans back complacently with the statement that he has licked the unions because he has secured the advantage for the moment, and believes he can go back to making them do what he thinks, instead of agreeing with them on what should be done.

The average worker is interested in his employment, his local conditions and his own living, far more deeply than he is in the progress of union organization. He will respond to the sincere effort of the manufacturer to establish methods of discussion and agreement if these are effected by a persistent effort which arises out of a desire for fair dealing.

The job cannot be done without patience and a considerable measure of understanding on the part of the manufacturer, because there is a large amount of suspicion to remove, and a new attitude of co-operation to institute. It needs a strong leader to establish an open shop which will be admittedly in advance of the present method of organization, and needs a measure of study which very few executives have given to the human side of the question.

The open shop can be made the best basis for agreement and unity. It will not serve its purpose, however, if the worker, because of ignorance, or because of the character of the attempt, reacts to it as did the two men mentioned at the head of this article.

Personnel Work Necessary in Dull Times

THE relatively great decrease in personnel departments and their functions since jobs became scarcer than workmen naturally brings up the question as to whether or not such abnormal decrease is justified. Manufacturers have given a number of reasons for cutting out such activities.

To find out what there is to say from the other side, a successful and intelligent personnel manager was asked this question the other day, "What is the use of a personnel department or industrial relations activity at this time anyhow? What is your excuse for living?" A brief digest of his remarks is of interest as presenting the other side of the case. His statement was something like this:

In the first place, safety work must be continued, whether the force is large or small. The records of our company show an actual saving of many thousand dollars a year since the institution of safety work, simply in compensation money and similar expenditures. Primarily for that reason our safety work is being continued during the present depression.

Health supervision also comes under our personnel activities. Even with a curtailed working force, the company wants the lowest possible unit cost of production, which, turned around, means the greatest quantity and quality output per man. This can be maintained only through a continuance of health supervision, both as regards accident and medical cases for the men left on the job.

In almost every plant there is considerable job analysis work to be done, which the personnel or employment department has been too busy to complete during the high tension period through which we have recently passed. This work must be completed before the hiring and placing of men can be done on an intelligent basis. The present inactivity in hiring gives the employment manager sufficient time to take up work of this nature, make further research into the various jobs, the conditions surrounding them and the human factors involved in the various production activities.

The task of laying off men properly calls for nearly as much intelligent effort as that of hiring them. When business picks up again every firm will want to rebuild its working force. The firm which has sent its men away with a friendly feeling toward the company will be in the best position to re-employ its former workmen. Where this can be done, thousands of dollars will be saved that otherwise would have gone toward breaking in new men to an unfamiliar plant. In the meantime the employment manager can keep in touch with the best of these men in one way and another, and thus insure their return when they are needed.

Assuming, of course, that the personnel department is pared down to a minimum along with the other administrative divisions of the organization, there appears to be a very definite field for its activities even during times of depression such as the present.

ALL YOU NEIGHBORS THAT HAVE BEEN WAITING FOR THE FROST TO GET OUT OF THE GROUND BETTER BE GETTING YOUR SEED IN!
AUTO TRADE RESUMPTION
AUTOMOBILE INDUSTRY

Cartoon from New York Tribune referred to on page 5 of last week's issue of AUTOMOTIVE INDUSTRIES

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE
Reg. U. S. Pat. Off.

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Stimulating Individual Effort

THE ultimate success of the open shop movement will rest fundamentally upon the fairness and patience exhibited by employers. The fact that an open shop is established and the power of the union eliminated or even diminished is in itself only an incident in the solving of the labor problem. The maintenance of a belligerent attitude on the part of employer or employees can have even a greater deleterious effect on production than union domination.

The ultimate futility of the fighting attitude was voiced recently by Herbert Hoover when he said: "We cannot attain equality of opportunity or maintain initiative through crystallization of economic classes or groups arraigned against each other, exerting their interest by economic and political conflicts. We cannot attain it by transferring to governmental bureaucracies the distribution of material and intellectual products.

"We can attain it by . . . the stimulation of individual effort in the whole mass."

Methods of stimulating individual effort over long periods of time have not yet been well worked out. Study and analysis of the factors involved and a determination of possible methods are the chief activities which lie ahead of those seeking a solution to the complex problem of human relationships in industry.

Thoroughgoing Fuel Research

IN England where the automotive fuel problem is more pressing if not more serious than in this country, one of the prominent petroleum companies has undertaken what promises to be the most exhaustive and thorough research into the inherent characteristics of liquid fuel and their effect upon engine operation ever undertaken. This research is being conducted not by a petroleum chemist or even by the engineering staff of a company in the oil business, but by a group of engineers, physicists and chemists including several of the foremost investigators in these lines which England has produced. The work is in charge of Mr. Ricardo, one of the most progressive automotive engineers in Great Britain, but a man whose training and experience is not primarily in fuel matters, but in engine design and the relations existing between design and performance as affected by the character of the fuel.

This is significant as indicating that the investigation will not be primarily of a theoretical nature—though the theory involved will quite properly be fully investigated and developed and the results checked from this standpoint—but rather that practical conclusions will be drawn. In short, it appears that the underlying purpose is to learn, first what fuels are best suited for efficient use in internal combustion engines, and second what inherent qualities render them superior to other fuels.

With such information in hand, and only then, will it be possible for fuel producers to intelligently proceed in making the fuel supply go furthest and be used with greatest convenience and satisfaction.

Thanks very largely to one or two progressive American investigators allied with the automotive industry we have come to learn in recent years some few facts—or at least some reasonably plausible theories—regarding the advantages and disadvantages of certain classes and grades of domestic fuel; something about the important effect of detonation upon the utility of fuel; and something about means for preventing or mitigating detonations by the use of "dope" and otherwise. Most of the information is vague and incomplete. Some of it appears to be of doubtful value if not actually misleading as judged by the results of the British investigation announced to date. All of which points to the need in this country of just such thorough and comprehensive research as our British contemporaries are undertaking.

There has been much talk about and there is great need of co-operative research in which the automotive and fuel industries should join, but little has yet been accomplished in this direction. When will those whose interests are so vitally concerned awaken to a full realization of the importance of getting to the bottom of the matter?

Fortunately the results of the British investigation referred to are to be made public. Some of them are given on another page of this issue. Is it too much to hope that some American fuel producer will see the light and take action similar to that taken by the Asiatic Petroleum Co.? Or will the matter be allowed to drift until a national emergency forces governmental action?

Thus far the initiative in fuel research in this country has been mostly from the automotive side, but even this has been limited to a small percentage of those who should be interested. There is a great opportunity for those willing and able to grasp it. It should be seized and turned to good account. Patriotic motives should rule, if self interest of the industries concerned is not sufficient.

A New Phase of Service

SERVICE of the vehicles now in the owner's hands is the most important problem before the automotive industry. Service means a lessened sales resistance; it means a greater respect for the products of the industry, and a much wider use of these products. It is an axiom that a chain can be no stronger than its weakest link. Certainly the automotive industry can never be stronger than is the acceptance of its service by the owners of the vehicles.

Just at present the interest in service is centered in a new plan for the distribution of service parts. Some parts manufacturers have already established stations in various sections of the country where dealers, independent service shops, and business organizations which are on the factory list as national buyers can obtain parts. This plan is favored by some manufacturers and opposed by others. It is looked upon as a solution of some existing problems by some parts manufacturers and by others it is utterly condemned. Indeed, this division of opinion exists within the executive staffs of some of the organizations chiefly interested. One sales manager openly favors this plan of distribution of parts, but says that other factory executives have overruled him and propose to let the vehicle manufacturer distribute the parts.

AUTOMOTIVE INDUSTRIES holds no brief for either plan. Both are subject to all of the human weaknesses that will appear in the organization that must be maintained for the carrying out of the project. The present plan of the vehicle manufacturer distributing parts to his dealers has developed certain defects which must be cured. These defects are too well known to need discussion here. What may be the defects of the new plan cannot now be discussed.

AUTOMOTIVE INDUSTRIES does, however, hold a brief for the best possible service. This proposition permits of no discussion. The attainment of better service is vital to the industry and to each factor in the industry. The service responsibility is growing faster than any individual manufacturer's business. At the beginning of 1920 the registration shows that in 1919 there were 7,596,503 vehicles in use and thus needing service. In 1920 there were 8,932,458 vehicles, an increase of 15.65 per cent in the service end of the industry. There is no adequate measure of the service facilities during that period.

With a business growing at the rate the need for service is growing, and will continue to grow as the number of vehicles increases, some wise steps must be taken. As the industry has grown there has been a constantly increasing number of orphan vehicles, and the lack of service facilities for these vehicles is a blow at the industry as a whole. Not every buyer is discriminating enough to realize that it was a mistake in his own judgment that caused him to listen to false promises. He is very likely to judge the industry by the experience he has had with the individual manufacturer.

There should be a distinct effort on the part of someone to see that the owners of orphan vehicles get service.

There is one point on which we believe that a distinct improvement could be made in the present service system. There is no disputing the fact that some manufacturers regard their sale of parts and service too selfishly. Sales have been spread over a very large territory, and it is physically impossible in some instances to maintain adequate service stations at certain points. It has sometimes happened where the vehicle was not properly represented in a service way, that independent service firms, fully competent to give this service, have been refused permission to buy the required parts at a trade price. Such narrowness in a service plan is almost unbelievable, yet it exists.

It is entirely safe to assume that the proper service has not yet been worked out, but the business is becoming of such volume and importance that it will, in time, assert itself and will override those who place selfish interests before the natural objective of service. We do not believe it is within the realm of business prophecy at present to say what form this service will take.

There will be experiments, there will be disappointments, but justice to the vehicle user and a reasonable business policy within the industry will prevail. Service is too big and too important for any individual or organization to much longer delay an equitable solution.

Conflicts and Co-operation

ANY close analyst of our industrial situation must recognize that, for the present at least, there are definite conflicts of interest between employer and employee. But at the same time there are numerous ways in which their interests lie along the same path. The progress of human relationships in industry depends largely upon which of these bases are taken as the starting point for industrial relations.

Better advancement can be made if both sides can come together for consultation upon the basis of those factors in which they really have a community of interest. From that point constructive progress can be made. When they come together on the basis of their differences, the probability of the growth of co-operation is not great.

Harding Endorses Highway Reforms

President Greets N. A. C. C. Committee

Likely to Support Townsend Bill —Conferences Held With Cabinet Officers

WASHINGTON, April 9—The Harding administration will maintain a sympathetic attitude towards the principles of highway transportation enunciated by the National Automobile Chamber of Commerce.

This was made clear in an announcement by President Harding after a conference yesterday with the highways committee of the N. A. C. C. While the President did not commit himself directly to the proposed Townsend bill providing for a commission to supervise a system of interstate highways, he declared he would advocate expenditure of Federal funds for highway building when adequate provision had been made by the States for maintenance.

The conference was the most important of a day devoted to meetings with Cabinet officers and Congressional leaders. Practically the entire directorate of the N. A. C. C. was in Washington for the conferences, probably the most important since the armistice, and they were accompanied by representatives of the Motor and Accessory Manufacturers Association, the Rubber Association of America and the National Automobile Dealers Association. As a consequence, virtually the entire industry was represented. The spokesmen of the industry were cordially received and the results of the day's work were considered fairly satisfactory.

President Harding openly denounced the present system of Federal aid, and statements he made to Senator Townsend as well as the highways committee indicated strongly that his support of their program was highly probable.

Must Study Permanent Effect

The President stressed the fact that hereafter Federal road money would not be expended with a view to the immediate and temporary effect, but always by its permanent and ultimate effect. The declaration that the present system was nothing short of criminal because no thought was given to permanency in construction could be interpreted in no other way than as warning to Congress to change its plan of distribution of highway funds. Though sectional interests will undoubtedly attempt to force the Federal aid bill through, the attitude of the President shows that it will fail through a veto, provided Congress ignores the desires of the Chief Executive.

The effect of the highways committee's conference was aptly illustrated when the President, in regular conference with Washington correspondents, expressed himself very clearly on the road-building program. His statements, in general, were in harmony with the utterances of George N. Graham, vice-president of Pierce-Arrow Motor Car Co., and Roy D. Chapin, president Hudson Motor Car Co., who had spoken on behalf of the industry. The President declared it was monumental folly to permit local communities to build roads which benefited a few and would deteriorate before the bonds issued for the construction matured. He pointed out that no Federal aid could be expected in the future unless States guaranteed maintenance.

In addressing the President, Graham said in part:

Graham Discusses Industry

"As representatives of the second largest industry in the United States, with sales of cars, trucks, tires and accessories in 1920 to a wholesale value of $3,578,000,000, we value the chance to direct your attention to the commanding place our industry has assumed in the nation's transportation.

"Our possibilities extend beyond National boundaries, for we now export cars and trucks to 114 countries, including 56 motor vehicles to Iceland in 1920.

"Less than a decade ago the European car was the standard of the world outside of the United States. To-day American cars are preferred to all others. American manufacturers must now meet the aggressiveness of the French, British and Italian governments who are striving to win back their automotive export trade by liberal credit extensions. The complications of exchange further handicap the American manufacturer. We welcome the efforts of the State, Treasury and Commerce departments to overcome these obstacles and will co-operate in every way possible.

"All transportation demands a proper measure of credit. Makers of motor vehicles and their distributors are entitled to just and liberal treatment both on part of the Federal Reserve banks and financial institutions in the various States.

"Happily our situation is much improved by the fact that we are one of the first industries to experience symptoms of returning prosperity, a result we attribute to the fact that business and individuals must have cars and trucks or be handicapped in efficiency.

Federal Consideration Needed

"At the present time our industry is so much exposed to the application of State rights that it peculiarly needs federal consideration. Every State, through control of its highways, can force motorists and truck operators to pay whatever proportion of its total taxes may be desired, regardless of equity.

"We concede the necessity of revenue, State and national, but urge that our burden should not be out of proportion to that of other forms of transportation.

(*Continued on page* 830)

Iowans Storm Good with Tax Opposition

Express Hope He Was Misquoted in Proposal of New Federal Wheel Tax

CEDAR RAPIDS, IOWA, April 9—Declaring that the automobile industry is "already overburdened with tax," automotive men of Cedar Rapids, the home town of Representative James W. Good, have risen in protest against the wheel tax measure proposed by their congressman. The action against the bill has been taken both under the banner of the Linn County Motor Trades Bureau and individually by automobile men. The trades bureau has written Good taking exception to the wheel tax and asking for further information from him concerning the proposed legislation. In addition, every garage owner, automobile or truck dealer, and other motor-interested men in Cedar Rapids and Linn county has written the local congressman a letter of protest against the proposed measure.

As soon as Good's plan to levy a wheel tax that would yield $200,000,000 a year revenue was brought to light here, a meeting of the Linn County Motor Trades Bureau was held and E. K. MaKibben, president, was instructed to communicate to Good the fact that his plan met with united disapproval of local men in the automobile field. To augment this, the motor dealers pledged themselves to write individual letters to Good in protest against the measure.

Contest "Luxury" Assertion

"We wish to take exception to a statemen attributed to you in the New York *Times*, issue of March 25," declared MaKibben in his letter as president of the Linn County Motor Trades Bureau. "This quotes you as saying that we have, in the United States, more than 8,000,000 passenger carrying automobiles, and practically every one is a luxury. This also quotes you as stating that you are in favor of a wheel tax that would yield $200,000,000 a year."

The remainder of the letter reads as follows:

"We do not think it possible that anyone at the present time would consider the automobile a luxury.

"We are very much opposed to a tax of this nature, as the automobile industry is already overburdened with tax.

"You, being an Iowan, must realize what a value automobiles are to Iowa farmers, and what a wonderful blessing they have been to Iowa farmers' families.

"We sincerely trust that you were mis-

(*Continued on page* 830)

Motor Cars Essential, Harding Says

Takes Up Highways in First Message

Declares Automobiles Indispensable—Demands Reforms in Present Road Work System

"The motor car has become an indispensable instrument in our political, social and industrial life."—PRESIDENT HARDING.

WASHINGTON, April 12—Essentiality of the motor vehicle has been recognized by the President of the United States.

President Harding, in his first address to Congress, proclaimed that the motor car is indispensable in every phase of American life. After discussing the problems of the railroads and the need for reduced rates to increase traffic, he took up the question of highway transportation, expressing complete accord with the arguments presented to him at a conference Friday with representatives of the National Automobile Chamber of Commerce. On this subject he said:

"Transportation over the highways is little less important, but the problems relate to construction and development, and deserve your most earnest attention, because we are laying a foundation for a long time to come, and the creation is very difficult to visualize in its great possibilities.

"The highways are not only feeders to the railroads and afford relief from their local burdens, they are actually lines of motor traffic in inter-state commerce. They are the smaller arteries of the larger portion of our commerce, and the motor car has become an indispensable instrument in our political, social, and industrial life.

"There is begun a new era in highway construction, the outlay for which runs far into hundreds of millions of dollars. Bond issues by road districts, counties, and States mount to enormous figures, and the country is facing such an outlay that it is vital that every effort shall be directed against wasted effort and unjustifiable expenditure.

Can Influence State Policy

"The Federal Government can place no inhibition on the expenditure in the several States; but, since Congress has embarked upon a policy of assisting the States in highway improvement, wisely, I believe, it can assert a wholly becoming influence in shaping policy.

"With the principle of Federal participation acceptably established, probably never to be abandoned, it is important to exert Federal influence in developing comprehensive plans looking to the promotion of commerce, and apply our expenditures in the surest way to guarantee a public return for money expended.

"Large Federal outlay demands a Federal voice in the program of expenditure. Congress can not justify a mere gift from the Federal purse to the several States, to be prorated among counties for road betterment. Such a course will invite abuses which it were better to guard against in the beginning.

"The laws governing Federal aid should be amended and strengthened. The Federal agency of administration should be elevated to the importance and vested with authority comparable to the work before it. And Congress ought to prescribe conditions to Federal appropriations which will necessitate a consistent program of uniformity which will justify the Federal outlay.

"I know of nothing more shocking than the millions of public funds wasted in improved highways, wasted because there is no policy of maintenance. The neglect is not universal, but is very near it. There is nothing the Congress can do more effectively to end this shocking waste than condition all Federal Aid on provisions for maintenance. Highways, no matter how generous the outlay for construction, can not be maintained without patrol and constant repair. Such conditions insisted upon in the grant of Federal aid will safeguard the public which pays and guard the Federal Government against political abuses, which tend to defeat the very purposes for which we authorize Federal expenditure."

Elwood Haynes Appointed Education Commissioner

INDIANAPOLIS, April 9—Governor Warren T. McCray of Indiana announced to-day the appointment of Elwood Haynes, president of the Haynes Automobile Co. of Kokomo, Ind., as a member of the State Board of Education for a period of four years. Haynes will succeed A. M. Hall of Indianapolis as the manufacturers' representative.

C. G. COMPANY STOCK SELLS

KALAMAZOO, MICH., April 12—Former stockholders of the old Kalamazoo Spring & Axle Co. have subscribed for $120,000 of the 8 per cent preferred stock and 1200 shares of common stock of the C. G. Spring Co. The stock is to be issued to them in a period extending over some 18 months. The newly acquired automobile bumper industry is now being moved to Kalamazoo and will be installed in the local plant. The head bumper sales office will also be located here.

U. S. Rubber Sales, $256,150,130 in 1920

Inventory Write-Off of $11,151,444 and Reserve of $6,000,000, Cuts Income

NEW YORK, April 11—A new high record for net sales was established by the United States Rubber Co. in 1920 when the total turnover was $256,150,130, compared with $225,589,465 for the preceding year. Net profits for 1920 after interest charges were $21,220,983, as compared with $17,730,237 in 1919. The balance for the common stock was $16,002,265, which was equivalent to $19.75 a share, compared with $24.18 in 1919.

Samuel P. Colt, chairman of the board of directors, in his remarks to the stockholders said, in part:

"To meet the heavy decline in prices of certain materials, notably cotton fabrics, inventories have been written down $11,151,444 below cost, thus bringing the inventory valuations down to a conservative basis. This reduction was charged against reserves previously created in anticipation of such a decline in prices. In addition to this write-off of $11,151,444, there was appropriated out of the income for the year 1920 and set up as a reserve, the sum of $6,000,000 to take care of any contingencies that might arise hereafter.

"There has been expended upon the plants and fixed properties of the company during the year 1920, $28,316,616, notably in the enlargement of our tire plants at Detroit, Hartford, Providence and Indianapolis. The work is practically completed and paid for.

The general balance sheet as of Dec. 31, 1920, showed net current assets of $187,128,205 as compared with $161,875,058 at the close of 1919. Cash on hand at the end of last year was $14,534,846, against $20,037,646, and inventory was valued at $123,403,029, against $87,633,699. Accounts receivable were $46,329,738, as compared with $40,770,428 the year before. Net current liabilities were $67,373,547, against $26,971,737.

NEW JERSEY INCREASES FEES

TRENTON, N. J., April 11—Increases in motor vehicle fees to bring the State additional revenue of about $1,200,000 a year have been authorized by the legislature.

It was provided that the minimum fee shall be $4 for a car of 10 h.p. or less. From 10 to 30 h.p. the fee will be at the rate of 40 cents a horsepower, and above that, 50 cents a horsepower. The fees for trucks will be based upon capacity, the smallest fee to be $10.

Maxwell President to Sell Off Plants

Action Part of Preliminaries to Consolidation with Chalmers —Working Capital Ready

NEW YORK, April 11—Reorganization and consolidation of the Maxwell Motor Co., Inc., and the Chalmers Motor Car Co. entered upon its final stage when simultaneous decrees were handed down Saturday in United States District Courts in Detroit, Dayton and Indianapolis, appointing W. Ledyard Mitchell, president of the Maxwell company, receiver for that corporation.

This action followed the filing by creditors of petitions in bankruptcy and means a temporary and friendly receivership. The step was decided upon some six weeks ago by the reorganization committee headed by Walter P. Chrysler. It is preliminary to the sale of the assets to a new company to be known as the Maxwell-Chalmers Corp. of Detroit. It will forestall action by disgruntled creditors and minority stockholders which might have embarrassed the reorganization committee.

All the property of the Maxwell company in Michigan, Ohio and Indiana is ordered sold. According to the Indianapolis decree the minimum bid to be considered is $10,915,000. It is expected that the sale and reorganization will be completed within 40 days.

The decree handed down by Judge Tuttle in Detroit contains the provision that the sale shall take place when such a step would appear to be advantageous. Judge Tuttle finds that the debts of the Maxwell company amount to $16,000,000. He appointed William S. Sayres, Jr., a special master to conduct the sale. The special master will receive bids for the property as a whole and for each nine parcels of it. It will be sold in blocks or in parcels, whichever is more advantageous to the creditors.

The reorganization of the two companies will be the largest in the automotive field since the war. Ninety-nine per cent of the bank creditors and 98 per cent of the merchandise creditors have approved the proposed consolidation. The proportion of stock of the two companies deposited with the reorganization committee is virtually the same.

To Take Over All Properties

All properties of the two companies will be taken over by the new corporation. This includes the Maxwell and Chalmers factories at Detroit, the Maxwell plant at Newcastle and the Maxwell body plant at Dayton. The Maxwell and Chalmers cars will be manufactured and sold as heretofore, except that there will be a largely increased production of an advanced type of motor vehicle. The other plants will be operated as they have been in the past.

The only surprise in the court proceedings to those who have followed the situation closely was the appointment of Mitchell as receiver. It had been understood that a new executive was to be appointed for the company but Chrysler, who has been directing the reorganization, is said to have been much pleased with the way in which the present president has conducted the business since affairs reached a critical stage many months ago. There is now a strong possibility that he may remain at the head of the company, although numerous changes in the executive personnel are expected when the reorganization is completed.

Will Have $15,000,000 Cash

When the reorganization is completed the new corporation will have available $15,000,000 in cash which has been underwritten by a syndicate of banks headed by the Chase National. The bank debts of the Maxwell company aggregate $12,000,000, and the merchandise debts about $4,000,000. The obligations of the Chalmers company are placed at approximately $5,000,000.

This statement in regard to the court proceedings was issued by the reorganization committee:

"The reorganization of the Maxwell Motor Co., Inc., to-day entered upon the final stages leading toward successful completion.

"This is the meaning of the initiation of a temporary and friendly receivership in the United States District Court. The primary purpose of the receivership, which was agreed to by all the interests concerned, is to establish title to the properties under the reorganization.

"The court appointed as received W. Ledyard Mitchell, president of the company, who, with Arthur E. Barker, general sales manager, has been in active direction of the Maxwell business during the period of the reorganization.

"Members of the committee said that this appointment is evidence of the continuance of the policies which have had so much to do with the recent upbuilding of the properties.

"They said further that the receivership clears the way for carrying out the larger plans which has already been put into operation on a limited basis. Strengthening and expansion of the factory and dealer organizations will proceed along the lines recently followed.

"The sale of the properties in accordance with the order of the court will no doubt be advertised almost at once, which will clear the road for the discharge of the receivers and the consummation of the reorganization plan, thus rendering available the new $15,000,000 of cash which has been held ready for months for the use of the company."

F.W.D. PRICE DOWN $700

CLINTONVILLE, WIS., April 11—The Four Wheel Drive Automobile Co. announces that effective April 4 the price of F.W.D. trucks was reduced from $4,900 to $4,200. The cut was made after a thorough survey of existing conditions, meetings with dealers all over the country and conferences with many fleet owners.

Efficiency of Labor Reaches High Point

High Production in Detroit Now Reached With Minimum Number of Men

DETROIT, April 9—With all factories at work in Detroit, many of them nearing the 100 per cent production stage figures on the labor situation give some idea of conditions as they will exist for some time in the future. Of 75 factories reporting to the Employers' Association, the total number of employees listed at work now is 132,858, or 57 per cent of the number employed the same time in 1920.

This, taken in connection with the fact that factories are maintaining a production ratio of from 50 to 100 per cent, indicates that there will be many left overs among the labor element when all factories have filled their quota.

Labor to-day in Detroit is as near 100 per cent efficient as is believed possible, and the turnover is giving employers little concern. Many idle men are hanging around the gates of the different factories and on the streets. This is particularly true at the plant of the Ford Motor Co. When the Highland Park plant went down in December more than 50,000 men were employed and the factory was turning out around 4000 cars a day. While there is no authoritative information on the number of men on the Ford Highland Park payroll now it is believed to be approximately 31,000. This in face of the fact that the plant is turning out an average of more than 3000 cars daily indicates that the factory can reach maximum or peak production with the addition of but a few thousand more men.

It is apparent, therefore, that thousands of former employees, who still are waiting patiently for the postal cards summoning them to work, will be disappointed. In fact, hundreds of men who have appeared at the Ford gates each morning have come to the conclusion that there is no chance of their resuming their old jobs and are looking elsewhere or leaving the city.

Clerks Not Replaced

The big force of clerks which was let off early in January has not been replaced and will not be. Many of those clerks were given opportunity to accept jobs in the factory and some did so. Others have refused to go into the factory, and were compelled to seek employment in clerical lines elsewhere.

Another feature at the Ford plant is that all foremen now are working—that is, foremen instead of walking around the different departments looking after the men, are assigned themselves to a task and keep busy at it, at the same time keeping an eye out for the men under them.

Practically the same situation exists in all other plants where production is being maintained with forces of from 50 to 75 per cent of the normal quota.

Wisconsin Factories Increase Production

Nash, Mitchell, Kissel, Ogren Report Gains—Parts and Truck Plants Active

MILWAUKEE, April 11—A marked revival of passenger car as well as motor truck sales in all sections of the country is being reflected into the automotive parts and equipment industries of Milwaukee to the extent that these industries are now in the lead in percentage of operations among all manufacturing groups. Especially since April 1 has it been necessary to extend operating schedules and re-employ men to meet the growing demand for parts and equipment. It is now confidently predicted that normal will be reached before midsummer.

B. W. Twyman, general manager of the 4-cylinder car division of the Nash Motors Co. at Milwaukee, said this operation is now on a 100 per cent production basis, and shipping 20 cars daily. Additions now under construction and contemplated for the summer will bring the capacity to 50 cars a day. The main Nash plant at Kenosha, Wis., increased its force by nearly 300 men in the last week and is operating at 66 2/3 per cent of capacity. Production will be on a 75 per cent basis by the end of the month. Normal production is 160 cars a day.

John Tainsh, general sales manager of Mitchell at Racine, says that the plant is operating at between 50 and 60 per cent of capacity, and with the demand picking up in all sections, save some parts of the South and Northwest, production is gradually being enlarged.

Kissel at Hartford, Wis., is producing on a basis of 60 per cent of normal, and is adding men every day as the spring demand for cars becomes more and more pronounced.

Fred L. Good, factory sales manager of the Ogren Motor Car Co., Milwaukee, said the plant is sold up to June 1 and new business is being received at a rate guaranteeing capacity production beyond that date.

Forge Plant on Three Shifts

The Interstate Drop Forge Co., Milwaukee, specializing in automotive forgings, is the high light among local manufacturers, as it is operating 24 hours a day in three shifts and employing the full capacity, with eight hammers. It is filling orders from Ford, Hudson, Scripps-Booth and other factories, reflecting renewed activity in motor car plants at Detroit and other centers.

Herbert A. Githens, sales manager of the Federal Rubber Co., Cudahy, suburb of Milwaukee, says the tire business has entered a new period of prosperity, and that within five or six weeks it probably will require full capacity. The Cudahy works extended operations from three days a week to five days during the past week. The early spring and mild weather are responsible for an unusual demand for tires for replacement as well as for equipment of new cars at the factories.

J. L. Sinyard, general production manager of the Parker Motor Truck Co., Milwaukee, said that early summer will find the plant working at full capacity, judging from the present development of demand. The Parker company specializes in trucks for highway construction and a healthy demand is now beginning to appear.

Truck Plants Feel Activity

J. C. Millmann, general manager of the Titan Truck Co., Milwaukee, said that within 30 days the plant will be operating at 100 per cent. Orders at present amount to about 80 per cent of new business a year ago.

It is regarded as significant that in their public expressions retail merchants generally are pointing to the automotive industries as taking the lead in a new era of activity and that with motor car trade once more getting into a healthy swing other business will follow. Predictions of general trade revival almost invariably lay stress on this point. It is frequently said that the passenger car business was the first to feel the depression and is the first to overcome its effect.

Retail sales by Milwaukee dealers during the first 10 days of April were the largest of any similar period of time within the last six months, and it is apparent that only a beginning has been made in the penetration of the resistance which buyers have been offering since last summer.

HASSLER FACTORIES ON OVERTIME WORK

INDIANAPOLIS, April 8—Officials of Robert H. Hassler, Inc., announced to-day that business had improved to such an extent during the past month that the factory had gone to working overtime. The first overtime worked was on April 4 and the company now is averaging about three hours a day overtime. Officials say there has not been a time in the last six months when prospects were as bright as now. Shock absorbers are manufactured at the plant. According to present plans the company will continue to work overtime until production catches up with orders.

PILOT AND DAVIS BUSY

RICHMOND, IND., April 8—Plants of the Pilot Motor Car Co. and the George W. Davis Carriage Co., are operating on about 80 per cent capacity, according to information obtainable from both factories. The Davis company expects to have full capacity operations underway soon to accommodate a good increase in business recorded in the last ten days. Many sales have been developed in territory adjacent to the plant.

Spring Starts Sales Humming on Coast

Dealers Report 60 and 90 Car Businesses in March—April Better

PORTLAND, ORE., April 9—The final advent of spring, which was ushered in on Easter Sunday with the sky radiant with sunshine, was the signal for the arrival along automobile row in Portland of the real spring buying. For months the dealers have been marking time, a little more than holding their own against a current of business depression, waiting for the weather to break so that the call to the open road would be strong enough to bring prospective motorists to a definite decision with regard to buying.

Warm weather and sunshine did just these things, for the dealers along the row report that their business Sunday far exceeded any previous day this year, and the following days of the week have lived up to the precedent set by Easter Sunday.

The numerous inquiries and the actual business done shows that there are any number of buyers who are simply awaiting their time to get the cars they want, dealers say. Some have been waiting for prices to fall, but with spring motoring fast coming on and every indication pointing to no further decreases in price they are giving up their waiting and are becoming actual buyers.

Business for many of the Portland dealers was excellent in March, judging from a cursory investigation among the dealers. In fact, every dealer reported that business has been rapidly improving for the last four or five weeks. One dealer reported the sale of 90 new and second-hand cars, while another reported 60. In both cases business had been nearly as good as in March last year, when Portland experienced phenomenal buying activity.

Another dealer reported five sales of new cars one day this week, and stated that he had orders for more of the same model far in excess of those on hand. Reports such as the above were heard on every hand along automobile row, indicating a decided improvement of business, and an approach, in fact, to the conditions of last spring.

DETROIT ADDS 6649 MORE MEN

DETROIT, April 9—Report of C. M. Culver, general manager of the Employers Association of Detroit, shows 6649 more men employed this week than last. The 79 firms affiliated with the Association reported yesterday a combined working force of 95,221. While this is far short of the number employed a year ago, factories reporting to the Association rapidly are nearing normal, both as to men employed and production. More men are being taken on daily, but the total when all factories are at 100 per cent will be considerably less than a year ago.

Harding Endorses Highway Reforms

President Greets N. A. C. C. Committees—Likely to Support Townsend Bill

(*Continued from page* 826)

"At present we are the most taxed of industries. We now have five main levies as follows:

"1. National and State income tax, common to all industries.

"2. Sales taxes, limited to ourselves and a few other industries.

"3. Taxes on repair parts, a permanent charge on the life of all vehicles, a tax specific to our industry.

"4. State license and registration fees, a virtual monopoly to us.

"5. Scattering municipal and personal property taxes.

"There are no federal sales tax on other units of transportation, as for example, steamships, locomotives, trolley cars and horse-drawn vehicles.

"The theory that the tax on motor vehicles is a tax on wealth is disproved by the fact that two-thirds of the nine million motor vehicles now in use in this country are owned in homes whose total income is $4,000 per year or less.

"It is right to reach the profits of the automobile manufacturer through the same taxes that apply to other kinds of business.

"We now accept without complaint State automobile taxes sufficient to keep all roads in repair. Thus we pay not only for the damage we inflict, but for that of all vehicles. Further we should not be called upon to go.

"More than one billion dollars are now available for road construction. Fifty-nine per cent of the national public works budget is devoted to highways. No single domestic activity of the United States Government and its civil sub-divisions predicates such large expenditures. Obviously the direction of such an effort should not be left as a subordinate detail in a department all of whose bureaus combined expend but one-third as much money annually as does the Bureau of Public Roads.

"Fundamentally the highway problem is not one of engineering but of economics. The first question is the determination of the economic reason for its location. Engineering is the detail of construction and maintenance. After that remains the paramount question of transport over the highway. For this reason road construction should be lodged under the direction of a body which has a broader vision than that of construction alone. For this reason, too, the lodgment of highways under a Department of Public Works would be to subordinate the end to the means.

Logical to Plead for Commission

"If it is logical to plead for a highway commission in the State, is it not logical that the National Government should follow the same policy? Most of the States adopted the commission plan at the suggestion of the Government when State highway departments were created.

"What is needed is a National Highway Commission—empowered to administer the Government's highway activities—to lay out and have constructed the inter-county roads of national importance, and to be responsible for the sound development of transport over the highways."

Later the highways committee conferred with Secretary of Agriculture Wallace and explained the problems relating to highways and pending legislation. As the Bureau of Roads is under Wallace at present and would be absorbed by the proposed commission, it is apparent that the President will ask for his views on the subject. The secretary stated that he had an open mind on the question and would consider it carefully.

Discuss Foreign Trade

The Foreign Trade Committee, with J. Walter Drake as chairman, talked over current problems of trade promotion with Secretary of Commerce Hoover. The conference was brief but satisfactory to the representatives of the industry for they obtained an insight into the plans of the new secretary and in turn showed him how the Department of Commerce could aid the automotive industry through extension of co-operative effort.

The conferees agreed that better results could be obtained through direct contact with the department here. As a result, it was decided to have President Clifton of the N. A. C. C. select a small committee for this work. Other industries will have similar representation, but the automotive leads the way. In addition to Chairman Drake, the industry was represented at the Hoover meeting by H. H. Rice, vice-president of the General Motors Corp.; H. M. Jewett, president Paige-Detroit Motor Car Co.; C. C. Hanch, vice-president N. A. C. C. and chairman taxation committee; Alfred Reeves, general manager N. A. C. C., and George F. Bauer, secretary foreign trade committee N. A. C. C.

Hanch and members of the taxation committee conferred with Senator Penrose, chairman of the Senate Finance Committee. The Senator advised them that it was impossible to advocate removal of excise and consumption taxes at this time or to take a stand on the sales tax plan. It was indicated, however, that he would accept the sales tax if Congress passed the soldiers' bonus bill. Senator Penrose stated that enactment of a soldier bonus would require heavy levy as disbursements would amount to $5,000,000,000 or more.

Mellon Not Committed on Tax

The committee discussed the same taxation principles with Secretary of Treasury Mellon to-day. The secretray would not commit himself to any specific plan other than join in the universal suggestion that excess profits taxes be removed.

In addition to representatives already mentioned, the other participants in the conferences were A. J. Brousseau, president International Motor Car Co.; E. S. Jordan, president Jordan Motor Car Co.; E. H. Broadwell, president Motor and Accessory Manufacturers Association and vice-president Fisk Rubber Co.; C. A. Vane, representing National Automobile Dealers Association; W. O. Rutherford, Rubber Association of America and vice-president B. F. Goodrich Co., and Pyke Johnson, manager Washington bureau of the N. A. C. C.

Motorcycles Bulk of Camp Jesup Sale

Only 400 Trucks and Cars in Lot —Buyers Come from Distant Points

ATLANTA, April 11—Twelve hundred motor vehicles were sold in seven hours Thursday, April 7, at Camp Jesup, Ga., near Atlanta, by a corps of auctioneers representing the United States Government, who are making a tour of various army camps throughout the country disposing in this way of motor vehicles used by the Government during the war. Most of the automobiles sold at Camp Jesup were in rather poor condition, prices paid ranging from less than $100 in a few cases to as high as $1100.

The sale included about 300 motor trucks, all of well-known makes, ranging in capacity from ¾-ton to 5-ton. There were about 100 touring cars and roadsters, 800 motorcycles and 500 sidecars.

Buyers were present at the Camp Jesup sales from some of the Northern and Eastern states, and from all over the South. They represented in some cases persons in quest of individual bargains for their own use, but there were also several speculators present and a number of dealers.

Dealers in the Atlanta territory do not believe that the sale will affect their business to any material extent, for many of the purchases were by men outside this section, only a comparatively few of the sales being to local dealers and buyers. The only effect on business that the sale would be likely to have will doubtless be of used cars, and it is not believed that its effect in this regard will be of serious consequence for so many of the cars sold at Jesup were in a very poor condition.

Iowans Storm Good With Tax Opposition

(*Continued from page* 826)

quoted and that you do not believe in a tax of this sort. We would appreciate very much hearing from you concerning this."

Of a similar nature are scores of other communications sent out by the automobile men of Cedar Rapids and Linn county. An example of the sentiment expressed may be found in the letter, which went to Good from the MaKibben Motor Co., Inc., as its protest against the passage of the wheel tax measure:

"We are vigorously opposed to this measure and consider that the automobile industry, at the present time, is overtaxed. We sincerely hope that you will give this question further careful consideration."

Local automobile men say that they feel the next steps in this matter should be taken by Representative Good and that they will wait further word from him in reply to their communications before taking any other action.

Find Concrete Roads No Longer Economic

Wisconsin State Highway Commission Seeks Right to Use Gravel Construction

THE comparative and final saving of a concrete road has entirely disappeared in many locations, with the increased costs of all types of roads.

Total abandonment of concrete surfaces is not urged. Many roads must be built of concrete or equally durable material, regardless of differentials.

The main motto in any road building project must be "to furnish transportation service to present day traffic." Neglect at times of primary rules of road building is defensible, with concentration on maintenance.

The day labor or force account plan in state road building enterprise has been found superior over contract building at least to the extent of getting actual costs and experiences.

MILWAUKEE, April 11—These are features which will be emphasized in the next annual review of the Wisconsin State Highway Commission, which is building a 7500 state trunk highway system in the Badger State, in connection with a number of pieces of legislation desired to further advance the work. For one thing, remedial legislation will be asked to permit counties which bonded themselves to build concrete roads, to use their funds for other types of construction.

The records of the commission show that in 1914 an 18-foot surface of concrete could be built for $12,000 a mile. In 1921, the cost will be about $25,000 per mile. In 1918, an 18-foot surface of gravel could be built for $3500 a mile; in 1921, $6,000. These figures do not include grading, culverting and bridging. Accepting it as a fact that a concrete highway is worth one-half of its cost at the end of fifteen years, and a gravel road one-half at the end of five years, the probable annual cost of concrete in 1914 was:

Figures Show Saving

Interest on investment, $600; depreciation, $400; maintenance, $100; total $1,100 per mile. For gravel, according to the commission's figures the costs are: Interest, $175; depreciation, $350; maintenance, $175; total, $700. The 1921 costs are estimated as follows: Concrete: Interest, $1,250; depreciation, $833; maintenance, $175, and total $2,258. Gravel: Interest, $300; depreciation, $600; maintenance, $250; total, $1,150.

Gravel in 1914 was cheaper than concrete by $400 a mile per year; in 1921, gravel will be cheaper by $1,108 a mile per year.

"These figures do not pretend to be exact for all roads and will change with locations, available materials and traffic to be served," said A. R. Hirst, state highway engineer, "and they only emphasize that the comparative and final saving of a concrete road in many locations has entirely disappeared since 1914." The economic positions of concrete and gravel are untenable to-day on many stretches, said commission members, where economy was undoubted six or even two years ago. Therefore the commission urges counties be given permission to use bond money provided specifically for concrete roads, under the state aid plan, for other and economically available materials. It is recognized that many miles of highway in Wisconsin must be built of concrete.

Try Out Construction Costs

The commission having found certain irreconcilable differences of opinion between contractors and the members as to fair prices for road building, the commission prosecuted a small part of Federal aid construction with day labor forces. It is the hope of the commission that each year a minor fraction of its work will be done under this system to keep in touch with actual cost situations, "and thus be able to deal fairly with contractors and the taxpayers."

The state law which limits county bonds to paying 5 per cent, is to be amended to permit 6 per cent rates.

A more intensive system of maintenance is demanded. The report will say, in substance: "It may be expected, despite the temporary depression in the sale of motor vehicles, that their use will constantly tend to increase, thus magnifying the difficulties of maintenance." The present patrol system is to be reinforced and more power is asked for state commission regulation of the county patrols. The commission also believes it must have complete control and direction over the highway marking system, now up to the counties.

Receiver Is Appointed for Lockwood Company

KANSAS CITY, April 11—The Lockwood Mfg. Co., making automobile tops, seat, tire and radiator covers, filed a voluntary petition in bankruptcy, April 8, in the Federal Court here. Schedules showed about $342,759 in unsecured obligations and $269,207 of assets, represented in stock and equipment in the Kansas City factory and warehouses, and the Buffalo factory. The Lockwood company has now no connection with the Baker & Lockwood Mfg. Co.

Albert Newman of the National Bank of Commerce was appointed receiver for the Lockwood Mfg. Co. He will continue operation of the plants, and it is expected that a sale will enable operation to proceed uninterruptedly.

GILLETTE RUBBER ADDS MEN

EAU CLAIRE, WIS., April 11—The Gillette Rubber Co., Eau Claire, Wis., has added more workmen in order to cope with increased orders and expects to reach a daily output of 500 casings by the end of the month. It has more than 1,000,000 worth of orders on its books and prospects for a 1921 business of at least $5,500,000. The daily capacity is 1000 tires and 2000 tubes besides mechanical rubber goods and specialties. L. A. Fosse is general manager.

Exporting Methods Are Found Improved

Mexican Dealers Gain More Favorable Impression of American Merchandise

WASHINGTON, April 9—American firms, including automotive interests trading with Mexico, are extending more credit and longer than during the war period, are shipping better merchandise with a greater assortment, and most of them have learned how to pack and ship for export. Consul J. B. Stewart at Chihuahua reports that these important facts have been obtained by inquiry from a number of Chihuahua merchants of all nationalities engaged in various lines of business.

During the war probably 90 per cent of the goods shipped from the United States were sold on a cash with order or cash against document basis. To-day reliable firms which do not wish to take advantage of the 30 days' cash discount (10 days is not attractive to merchants in Mexico) are being granted 60 to 90 days and some old customers are receiving as much as 120 days. And, as it always takes European goods from six weeks to two months longer to arrive than American goods, the 120 days' credit is as good as the six months' European credit about which so much has been said and written.

The war made it impossible in many cases for the American manufacturer and jobber to send out the quality and assortment of goods which he desired, any many foreign merchants, who up to that time had made most of their purchases in Europe, obtained a wrong impression of the standard of American-made goods. That impression is now giving way to one much more favorable to American merchandise which many in Mexico admit is as good as, and in many cases better, than European-made goods.

But notwithstanding, the statement adds, it cannot be denied that there is a quiet, persistent propaganda on foot which has for its base the theory that once European firms are again seriously competing for the Mexican market, merchants then will be able to buy goods on very long credit terms, that the merchandise from Europe will be of a higher quality than they now are receiving, and that it will be packed in a highly satisfactory manner.

OAKES BUYS MATHER PATENT

INDIANAPOLIS, April 11—The Oakes Co., manufacturers of radiator cooling fans and other automobile parts, has acquired the sole license to manufacture and market automobile tire carriers under the Mather patent, No. 1324461. The Mather patent covers the demountable feature of the tire carrier on a standard type of support bracket. The chief advantage is the interchangeable feature of the bracket.

Earl Reorganizes Briscoe Personnel

New Division Sales Managers Are Named as Preliminary to Sales Campaign

DETROIT, April 11—With the company on a sound financial basis, C. A. Earl, newly elected president of Briscoe Motors Corp., has perfected the reorganization of the company's personnel and formulated plans for speeding up production in the factory at Jackson. The Tilden and Swift interests of Chicago, which control Briscoe, have issued 100,000 shares of stock at $20 a share for the use of the company as working capital. Rules of the stock exchange and other technicalities necessitate waiting a certain number of days during which time present stockholders are given preference in subscribing to the issue before the money actually can be turned in and the stock taken over by the financial interests in control.

A representative of the Chicago financiers said Saturday the interests behind Briscoe had full confidence in the company's product, and with Earl in control had every assurance of a bright future ahead. Ample financial backing is assured the company, he said, to carry out policies and plans formulated by Earl.

As the first step in putting the plant on a quantity production basis, and at the same time perfecting a sales organization that will put the car in the forefront, Earl announced the selection of K. R. Jacoby, former director of purchases for Willys-Overland, as the new director of sales. J. R. Findlater, a veteran at Briscoe, continues as vice-president in charge of Pacific Coast distribution. H. F. Wardwell, who was succeeded as president by Earl, remains as vice-president.

Other officers are: John Fletcher, treasurer; L. C. Allen, assistant treasurer; L. E. Latta, secretary; E. R. Cowham, assistant general sales manager; D. M. Shaw, advertising manager; Victor Jantsch, chief engineer; J. C. Cunningham, general superintendent; T. W. Tinkham, assistant general superintendent; J. L. Blyth, director of service; W. M. Zerby, traffic manager.

Look for Extensive Business

New division managers also have been named by Earl as follows: J. A. Garrity in the Western Division; F. A. Bixby, Northwestern Division; H. G. L. Campbell, Eastern Central Division; C. E. Rollins, Western Central Division; J. C. Baggott, Eastern Division, and A. H. Jones, assistant to J. R. Findlater, on the Coast. R. M. Chapman, who has been associated with Earl for several years, is made assistant to the president.

The factory has started on a production of 20 cars a day, which will be increased gradually, according to Earl, until it is hoped to reach a daily output of 75. This, of course, is contingent upon market conditions and sales requirements. Earl, however, feels assured the present rapid improvement in sales will continue, and with confidence in the Briscoe, as a leader in its line, he is certain there will be a ready market for as many cars as can be produced under present factory conditions.

"When I accepted the presidency," said Earl, "I did so because I was convinced Briscoe had no superior in its field. It is not nearly so well known as it should be owing to the fact that the company has been content with moderate production nearly always oversold. The car itself has met competition succesfully wherever it has been introduced. The financial resources of the company are ample for any expansion that may be desired, and I took the presidency with the stipulation that we would go out after business on the scale which the car and the standing of the company justified. Readjustment of the executive organization by the addition of several strong men is the first step."

Texas Motor Creditors Would Operate Plant

CHICAGO, April 11—L. S. Maremont, president of the Maremont Mfg. Co., one of the principal creditors of the Texas Motor Car Assn., has sent a letter to creditors of the Texas company, which is now in receivership, urging concerted action which will permit continued operation of the plant in such a way that creditors will realize a substantial sum on their claims. In his letter he asserts that unless operations can be continued there will be no equity in the plant for the creditors. The only assets are the plant, equipment and inventory. The investment in the factory aggregates more than $1,000,000, but there are mortgages against it amounting to $250,000. The liabilities are something over $500,000.

Maremont says in his letter that a tentative plan for continued operation of the plant has been submitted to the receivers, the court at Fort Worth and the bank which is by far the largest creditor. All of them have approved it as the only means of realizing anything for general creditors. Financial interest familiar with reorganizing and operating automobile plants are said to be willing to advance sufficient funds to continue work at the factory in order to use up the large stock of parts, units and accessories, a considerable part of which are of special design and which can be made of value only by assembling them into finished cars. Creditors are asked to give Maremont their approval of his proposal.

SALES MANAGER SUES COMET

DECATUR, ILL., April 11—G. Vernon Beck, former sales manager for the Comet Automobile Co. of this city, is suing the company for $40,000 for alleged breach of contract. Beck claimed that under his contract he was to receive a number of shares of stock in the Comet in addition to his salary. He said he had been unable to secure fulfillment of this contract and his resignation followed.

Harvester Notifies of Work Suspension

Lack of Foreign and Domestic Demand Cause—Lower Costs Must Develop

CHICAGO, April 11—The International Harvester Co. has sent a circular to the employees in its tractor works informing them that on May 1 the company will have on hand all the tractors it can reasonably expect to sell this season and that it will be necessary to curtail production to such an extent that it will amount virtually to closing the plant.

After explaining the reasons for the lack of foreign and domestic demand for tractors, the company says it already has reduced prices on large lines of its output at a heavy loss under present prices for labor and material. Lower costs of material and labor must develop, it is asserted, before industry can hope to get back to normal production.

The circular says that according to the best judgment of the company it is improbable operations will increase for several months, although it is hoped they may be somewhat better in the early fall. Announcement of the proposed shutdown is made now to give employees every opportunity to obtain employment elsewhere.

"Operations have already been continued in spite of heavy cancellations of orders and at serious risk of overproduction so that the maximum employment might be afforded during the winter months," says the circular. "It is hoped that employees will realize that the conditions which make suspension necessary are beyond the company's control. Cancellations of orders for domestic trade are due to the severe drop in the price of farm products, which took place last fall after work had already begun on the schedules of manufacture at this works. As a result, farmers generally have been compelled to sell their products at prices far below what they had hoped to receive and frequently below the cost of production. Therefore they have been and are in no position to buy farm machinery in any such quantity as in normal times.

"The foreign trade, which before the war furnished nearly half the company's volume of business, has been heavily reduced on account of the difficulty of many of the nations and the fall in exchange value in the moneys of other countries."

OHIO GASOLINE DOWN TO 27c.

TOLEDO, April 11—Joyful news to motorists this morning was announcement of a drop in price of one cent a gallon for gasoline, naphtha and varnolene by the Standard Oil Co., making a retail price of 27 cents for gasoline. One cent price declines have been coming every three or four weeks since the first of the year.

Car Finance System Approved by Banker

Vice-President of Irving Finds Development Logical Sequence of Industry's Growth

NEW YORK, April 11—The system used by automobile financing companies was approved by Charles Elliott Warren, vice-president of the Irving National Bank, in an address at the Automobile Club of America. In a discussion of the automotive industry he said:

"The dealers who relied upon local banks before the peak of restriction in credits, turned with a rush to the automobile finance corporations, acceptance corporations and others. There are now more than 110 of these corporations operating in the United States—some local, some state wide and some national. Between 45 and 50 per cent of all cars being sold to-day are marketed on some form of a deferred payment system. Without doubt the methods or system used by these companies in financing both the wholesaler and the retailer are a logical financial sequence and eventually place automobile paper in the same class with any other commercial paper—but back of it must be analyzed the integrity of the company and the dealer.

"Briefly speaking the meaning of the automotive industry is first *Transportation*, involving the use of the truck for the short haul and for the long haul and the saving to the railroads. Second—*The Family Automobile* for the saving of time and the carrying of supplies and the pleasure vehicle. Third—*The Development of the Farm*, the tractor, haulage of supplies and product—the economic value to agriculture.

"Now as to the future of the industry, the war opened the eyes of the world to quick transportation in which the motor played an important and prominent part. It developed transportation in out of the way places and brought about the application of American export of machinery units for the automobile and it must necessarily follow that the manufacturer, dealer and retailer will place the automobile as an American product in foreign countries as was done with the sewing machine. These ends, if brought about, will develop the market.

Must Enforce Economy

"May I say the health of this great automobile business depends upon the stabilizing of the industry by a better production, by economy in manufacturing and selling and by more capable salesmanship, and by dependability and integrity of those interested in the business.

"To sum up, let us say then the outlook is encouraging and while the world is not yet well again, and care and prudence must be exercised in all matters, business men realize that forced action based on artificial optimism may lead to unwise action and produce further embarrassment."

SALES RUN TO $750,000 AT INDIANAPOLIS SHOW

INDIANAPOLIS, April 11—John Orman, manager of the Indianapolis Automobile Trade Association, has compiled a report for the board of directors on sales made by dealers and distributors at the recent spring automobile show at the State fair grounds. The report was submitted at the regular meeting of the board and shows that $660,840 was the total of sales, but conditional sales run the figure far above $750,000. Orman would not count verbal reports of about fifteen exhibitors. Twenty-three firms reported their retail sales numbering 219 jobs as amounting to $553,349.88 and wholesale orders for sixty-three jobs reported by the same dealers amounted to $107,490.

Southern Indiana Sales Show Steady Increase

INDIANAPOLIS, April 9—Every evidence of a sharp increase in motor vehicle sales throughout Indiana in the last week bears out the many predictions of the first quarter of the year. Weather of the last week has been ideal and the increased business is generally credited to the sunshine.

In the southern half of the state sales have been picking up steadily for the last three weeks but took a sudden jump with the first of April and distributors here say that stocks will be heavily depleted if buying continues through another ten days in the ratio of the last half of March.

The automobile show in Terre Haute, this week, was graced by a fair opening attendance, which increased heavily the second and third days and by mid-week buying was generally reported, although sales were not recorded in the first two days of the show. The Vigo county tradesmen believe that the show would have started a renewal of buying without the good weather.

FORT WAYNE INDUSTRIES BOOM

FORT WAYNE, IND., April 11—From all reports the unemployment in Fort Wayne is rapidly vanishing. With the labor situation taking such a decided turn for the better, local business men are feeling more optimistic than they have for some time. There are only one or two factories running full time, full pay, but some of the factories which have run but a week or two since the first of the year are announcing a resumption of business and the building operations are increasing rapidly. Dealers report business is on the increase and the majority of them are quite optimistic over the outlook, although it is expected that business will be slow during the summer.

British Makers Try Trade Experiments

Wolseley Reduces Refinements to Cut Price—Humbers Introduces Larger Car

LONDON, March 24 (*By Mail*)—Two announcements made by prominent British motor manufacturers this week are of interest as showing entirely diverse policies in respect of light cars. Wolseley has put forward a popular rendering of the 10 hp. two-seater, stripping the standard model of non-essential refinements, such as electric light and engine starter, leather upholstery and superfine exterior finish, and is selling this "utility" type at $400 less than the standard.

Humbers, on the other hand, has introduced an enlarged edition of its 10 hp. chassis, fitting an engine with 3 mm. larger bore (68 x 120 mm. in place of 65 x 120), far better and roomier bodies, longer wheelbase, many important detail chassis improvements and a more complete equipment. This new model—for so it may be viewed—displaces two hitherto standard chassis, for until now the chassis of the two-seater has differed widely from that of the four-seater; in future the same will serve for both.

Wolseley, therefore, is appealing to the market with a "short purse" by offering an abbreviated equipment. Humbers, also, with a light car is putting forward something better for the same price as hitherto for the four-seater ($3,500) and at $300 more for the two-seater. The Wolseley Ten has a smaller engine (1260 c.c.) and chassis than the Humber (1783 c.c.), and the former is not fitted with four-seated bodies; but both represent the really high-grade British light car.

Developments of prime importance are anticipated in other directions before the end of the year; one firm hitherto making only "super-grade" cars of over 30 hp. has half a dozen experimental cars running, these consisting of two-cylinder, air-cooled engined runabouts with friction drive, while another high-grade car maker is designing a popular type on entirely different lines. The "economy wave" is undoubtedly making itself felt in many directions and will have an important effect upon the industry.

The British trade has livened up very appreciably during the last two or three weeks and most plants are on full time again with, admittedly, a more or less abbreviated staff.

TO RESELL REYNOLDS' ASSETS

MT. CLEMONS, MICH., April 11—Resale of the assets of the Reynolds Motor Truck Co. has been ordered by Circuit Judge Tucker for April 26. The original sale by Charles J. Reimold, the receiver, for $26,000, was not acceptable to the court.

Parts Service Decision Hangs Fire

Committees to Try to Reach Settlement

Truck Makers and Parts Men Adhere to Positions—Prices Discussed

DETROIT, April 12—Following several hours' discussion here to-day of the national parts servicing plan proposed by unit makers, it was apparent the contending factions were as far apart as ever. A joint committee of ten men representing truck assemblers and parts manufacturers was named to conduct further negotiations looking to a compromise plan.

General Sales Manager A. J. Whipple of the Republic Truck Co. brought the discussion to an end with a motion for appointment of the committee "to discuss ways and means for co-operation and to formulate plans looking to our mutual benefit." An amendment authorizes the committee to invite representatives of the National Automobile Dealers Association or others interested, to participate if they see fit. The committee will report back to a joint meeting of the Motor Truck Manufacturers Association and the parts manufacturers, to be called upon notification of the committee that its report is ready.

The committee is composed of M. L. Pulcher, general manager of the Federal Motor Truck Co., chairman; M. Cook, general manager of the Service Motor Truck Co., J. W. Stephenson, vice-president of the Indiana Truck Corp., Col. F. F. Smith, vice-president of the Republic Truck Co., E. A. Williams, representing the Truck Association, and L. M. Viles, vice-president of the Buda Co., William Mack, sales manager of Borg & Beck; Fred Glover, vice-president of Timken-Detroit Axle Co., H. L. Horning, general manager of the Waukesha Motor Co., and G. W. Yeoman, vice-president of the Continental Motors Corp., representing the parts manufacturers.

"Harmony Didn't Mean Anything"

It became apparent at the outset that both sides were determined in their stand and while there was an evident inclination to get together the point of contact could not be reached. Despite the surface harmony there was always apparent an undercurrent of determination to stand pat and the result of the meeting is best summed up in the statement of a prominent parts manufacturing executive, that, "there was lots of discussion and lots of harmony but it doesn't mean anything."

The outstanding feature is that everyone interested is determined to give full consideration to the problem of proper service which means satisfied customers and increased truck sales. The matter of price standardization also was a theme for much discussion indicative of growing conviction that a uniform price list must be made effective.

The strength of the "wild-cat" manufacturer was stressed by Estel Scott, general manager of the General Automobile Parts Co. of Kansas City, who declared the present conditions were responsible for his success.

Service Requires Capital

Emphasizing his point, Scott said he carried a $62,000 stock of parts and contended every dealer must be equipped similarly to properly service his line. Service, he said, was the vital problem to-day and if it is not adequately furnished the business will be killed. Scott made a plea for a systematic campaign of investigation among individual users to get their idea of best methods and insisted they would be a unit in demanding the plan that assures service, no matter by what name designated or by whom maintained.

Whipple, opposing the plan, said the real question is who is going to conduct the parts servicing business. He asked if it was presumed the men who built up the business were going to turn it over to the parts makers, virtually admitting they were incompetent to conduct it. "We want to conduct the business along proper servicing lines and we are asking only co-operation," he said.

Harry G. Moock, general manager of the N. A. D. A., made a strong plea for the dealer who, he declared, was struggling in desperation to keep his head above water. In the final analysis, he declared the dealer is the one to be considered as the point of contact between the truck manufacturer, the parts maker and the consumer. "Educate the dealer and show him wherein his duty to his manufacturer and his customer lies but don't take away his profit and force him out of business," said Moock. He cautioned his audience to take the dealer into its confidence lest it run against a wall of opposition when the time for settlement comes.

Service Man Gives Views

R. C. Rognan, president of the Automotive Service Association of New York, said the truck manufacturer had not given consideration to proper servicing. If he had he would now be servicing his product and the present conditions would not have arisen, he said. Rognan cited cases of many fleet owners now servicing themselves and said many others were contemplating similar efforts because of the inadequacy of servicing by dealers. He said if central stations were maintained fleet owners could buy more

(*Continued on page* 840)

Price Fixing Bill Offered in Senate

Labor Organizations Included in Provisions—Owen Would Regulate Bank Interest

WASHINGTON, April 12 — An amendment offered by Senator King of Utah would tighten the Sherman anti-trust law. The amendment would include labor organizations under the act. Section one of the King amendment practically covers open price plans and other forms of information relating to prices. The section reads:

"Every contract, combination in the form of corporation, trust or other form of association, agreement, arrangement, meeting, conference, understanding or conspiracy for purpose of monopolizing, dominating or controlling the trade or commerce in any commodity between two or more states, or for the purpose of fixing or determining the price or prices, charge or charges, at which any commodity may or shall be sold for transportation in trade or commerce between two or more States, or for the purpose of including, or preventing, or impeding any person from buying or selling, procuring or disposing of, dealing in, producing, manufacturing or fabricating any commodity for transportation and commerce between two or more States is hereby declared to be illegal."

The penalty ranges from a fine of $5000 to one year in prison.

Senator Edge of New Jersey, author of the so-called Edge Act, which was designed to stimulate foreign trade, has offered an amendment to the act intended to expedite the operation of the law. The amendment liberalizes certain sections so that operations may begin when corporations organized with capital stock of not less than $2,000,000 have paid in 25 per cent of the stock. The remainder of the capital stock may be paid in installments of 10 per cent of the whole amount at intervals of two months.

Alleges Banks Profiteered

Senator Owen, of Oklahoma, introduced a bill to-day amending the Federal Reserve Act in order to prohibit excessive rates of interest charged by bankers to industry. The bill would prohibit a rate of interest in excess of 6 per cent on loans secured by stocks or bonds as collateral. The Senator insisted that the Federal Reserve Banks have profiteered shamefully while legitimate industry suffered during the depression.

Congressman McArthur, of Oregon, to-day introduced in the House a bill providing for the appropriation of $75,000,000 for highway construction.

Congress Will Bar Truck Dumping

Reimportation Evil to End, Smoot Says

Will Insist on Specific Provision in Any Anti-Dumping Bill Passed

WASHINGTON, APRIL 13—No anti-dumping bill will be allowed to pass in the Senate without a specific provision covering reimportation of army trucks and other surplus war supplies sold abroad.

This statement was made to-day by Senator Smoot in an interview given the correspondent of AUTOMOTIVE INDUSTRIES. The anti-dumping measure which Representative Young of North Dakota introduced in the House Monday did not carry this proviso.

Senator Smoot feels that the anti-dumping measure is for the protection of domestic markets from foreign competition and that it must embrace all phases of the problem. He is prepared to draft an amendment to the Young bill if it passes the House without the provision essential to the protection of American manufacturers and dealers.

Representative Young told AUTOMOTIVE INDUSTRIES that his bill was designed to cover every form of dumping but admitted that the question of reimportation had not been considered specifically. When it was pointed out to him that a heavy burden was placed on the American automotive industry by the reimportation of American made vehicles, duty free, and their sale here at prices below production costs, he indicated that this condition could be corrected by amendments offered from the floor when the bill is before the House.

It is expected that dealers in California and other states who have felt the effects of the sale here of surplus war supplies by foreign agencies will appeal to their congressmen for action.

STAGE TRUCK DRIVEAWAYS

DETROIT, April 9—Truck manufacturers throughout Michigan have been taking advantage of the open roads for truck driveaways in the last week. Acme Motor Truck Co. of Cadillac has staged driveaways to Grand Rapids, Detroit and many other points in the southern part of the state. Last week a fleet of four trucks consisting of three 2-ton gravel dump jobs and a 1½-ton chassis were driven to Grand Rapids.

CONGRESS GETS TRACTOR BILL

WASHINGTON, April 13—Senator Ball, of Delaware has introduced a bill providing for the transfer of 1000 five-ton caterpillar tractors, complete with spare parts; 500 ten-ton tractors, and 200 Mobile machine shop units, from the War Department to the Bureau of Roads for use in highway construction.

Senator Pittman has introduced a bill providing for a national license system for automobiles. This measure has the support of automobile organizations and is designed to force reciprocity on states which have special requirements for automobile owners.

Goodyear Refinancing Definitely Completed

AKRON, April 14—The special meeting of stockholders of the Goodyear Tire & Rubber Co. to ratify the reorganization plan is being postponed from day to day pending the completion of preliminary details. Negotiations for the refinancing have been definitely consummated, however. It is understood that Goldman, Sachs & Co. of New York will head a syndicate which will offer $25,000,000 in 20 year 8 per cent first mortgage bonds while Blair & Co. will head a syndicate to offer $25,000,000 in 10-year-8 per cent debentures.

The company has filed with the secretary of State of Ohio articles reducing its common capital stock from $100,000,000 to $1,000,000. This is said to be merely one of the steps preliminary to refinancing.

Interest Law Revision Asked

COLUMBUS, April 11—Legislation by the state of Ohio is necessary to enable the completion of the refinancing of the Goodyear Tire & Rubber Co. of Akron, the General Assembly of Ohio was told to-day after the introduction of a bill by Senator W. H Chatfield to permit any corporation to borrow money without regard to the rate of interest. Ohio at present limits corporations to 8 per cent.

Exclusive Sale Move Is Denied by Dodge

DETROIT, April 13—Denial is made by the Dodge Bros. Motor Car Co. that it has informed all dealers that they must handle the Dodge line exclusively or forfeit their contracts. Recent changes in representation in two or three large cities are responsible for the report. When new dealers are appointed, the company asserts, it is simply because of local conditions and not the result of a general policy.

ERSKINE N. A. C. C. DIRECTOR

NEW YORK, April 14—A. R. Erskine, president of the Studebaker Corp., has been elected a director of the National Automobile Chamber of Commerce to succeed C. W. Churchill of the Winton Co. who has engaged in other business.

Endorse New Plan for Standard Parts

Creditors Accept Reorganization Proposal—Would Retain Control of Company

CLEVELAND, April 12—An assemblage of creditors representing $7,500,000 of the $9,500,000 outstanding obligations by unanimous vote to-day accepted a reorganization plan for the Standard Parts Co. The vote was taken after an all-day session during which representatives of the largest creditors of the company spoke in favor of the proposed plan.

Frank Scott, one of the receivers, who withheld approval of the proposal when it was first broached to him, said he did so because some of the creditors had expressed to him their discontent with it. Scott said that he felt these objectors had been appeased to an extent and he said he was now ready to present the plan to Federal Judge Westenhaver should it be ratified.

In brief the reorganization plan provides for the sale of the Standard Parts Co. property to an individual representing the creditors. This purchaser is to resell the plant to a new corporation to be formed in consideration of $6,500,000 of mortgage notes bearing 8 per cent interest, all of the management stock and 110,000 shares of the common stock The management stock consists of $1000 of preferred stock, consisting of ten shares of $100 each, and it is to elect a majority of the new company's directors. This stock is to be under the control of a managing committee, the members of which are to be made up of the Creditors' Committee. Through this plan the creditors would retain their hold on the corporation and if the stockholders did not carry out their part of the plan, the creditors could go through with some other proposal.

Stock Worth $35 a Share

It is estimated that the common stock will be worth $35 a share. It is to be sold to old stockholders of the corporation and the proceeds of this sale, together with the income from the $6,500,000 of mortgage notes, will take care of the total indebtedness of the corporation.

The plan has the approval of the preferred stockholders and the reorganization committee in addition to the creditors. Efforts are to be made to obtain the consent of creditors who were not represented at to-day's meeting and speakers voiced the hope that petition for sale of the property would be filed within 30 days. It was estimated that from $1,200,000 to $3,000,000 would be

(*Continued on page* 840)

Unemployment Light in French Factories

Situation Far Less Serious Than in United States or England, Report Says

WASHINGTON, April 9—According to Monsieur Laurent, secretary of the Confédération Générale du Travail (General Confederation of Labor), there is a great deal less unemployment in France, proportionately, than there is in the United States or in England, and it is of a much less serious character. A report on the labor situation received by the Bureau of Foreign and Domestic Commerce from Eugene A. Masuret clerk to the American trade commissioner in Paris, says that Mr. Laurent estimates the number of unemployed workers in the various trades throughout France at between 120,000 and 150,000.

Unemployment in the metallurgical trades affects mostly the laborers and the semi-skilled workers. Many men were taken on in this industry during the war from other trades, and, although not efficient, did not return to their former trades. The skilled worker is generally retained, unless, of course, the plant is completely shut down.

In Paris the total number of unemployed is between 50,000 and 60,000, principally in the metallurgical and furniture trades. The proportion of unemployed in the latter trade is 50 per cent, due mainly, it is stated, to American competition in this line. Unemployment on a large scale is anticipated within the next month in the textile trade at Lille, Troyes and Rouen, because of overproduction. In the shoe industry at Millau (Aveyron) there are now 2000 unemployed, 1200 men and 800 women.

M. Laurent explained that there are two kinds of unemployment in France—unemployment caused by a real lack of work, and preventable unemployment—the latter being temporary in nature and for the purpose of forcing a reduction in salaries. For instance, some employers, it is stated, close down their plants for a period of a week or so, and then reengage their employees at, say 20 francs per day instead of 25 francs per day which they formerly paid them.

M. Laurent further stated that there is little probability that unemployment in France will reach a critical stage. The number of unemployed is constantly varying; while some workers are being laid off, others are being taken on. At no time, M. Laurent said, is there a complete cessation of work in any one line of industry throughout the whole country.

JAPANESE LIKE LIGHT CARS

WASHINGTON, April 8 — Consul Hawley has advised that 98 per cent of the passenger automobiles in the Nagoya (Japan) Consular district are of American manufacture. The prices asked for such cars range from $1,000 to $3,000, while half-ton motor trucks are from $3,500 to $4,000. Trucks of 1 and 1½-ton capacity seem most suited to local requirements. There are about 100 trucks and 700 passenger cars in the district. The better class of trade prefers the 6-cylinder car as being the most efficient. There is no specific requirement as to location of steering wheel; a minimum of two headlights is required.

German Exports to England Total £31,126,088 in 1920; December Quarter with £10,494,000 Largest Since War

WASHINGTON, April 9—The total value of imports from Germany into the United Kingdom in 1920 aggregated £31,126,088, of which £8,743,000 was received in the September quarter, and £10,473,881 in the last quarter, according to official monthly returns of the trade, but in Parliament, on Feb. 21, 1921, the value in the December quarter was stated to have reached £10,494,000. Figures showing items imported have been received by the Bureau of Foreign and Domestic Commerce from Alfred Nutting, clerk in the American consulate in London. Copper, iron and steel, dry goods, motor car parts, machinery and other items imported in the fourth and third quarters are as follows:

	Quarter Ended Sept. 30, 1920		Quarter Ended Dec. 31, 1920	
	Quantities	Values	Quantities	Values
Copper, in bars, etc., electrolytic, tons	203	£22,023	1,416	£143,386
Cotton gloves and mfrs.' small wares, doz. pairs	22,024	373,445	37,168	50,055
Dyes and dyestuffs from coal tars, cwt.	23,732	1,010,546	59,366	3,041,798
Iron or steel tubes, pipes and fittings, tons	599	29,546	1,066	47,012
Jute piece goods, cwt.	4,439	27,788	6,727	33,698
Pig lead, tons	1,762	66,873	3,884	136,251
Dressed leather, cwt.	104	17,727	164	27,461
Machinery for printing, bookbinding, etc., tons	125	24,556	206	33,615
Motor car parts and accessories, except chassis	...	48,793	...	74,180
Steel bars, rods, angles, etc., tons	162	6,866	1,276	43,785
Woolen and worsted tissues, cwt.	534	40,755	891	56,624
Zinc, crude, tons	1,664	67,356	7,671	314,612

In the above the total in the December quarter is about 140 per cent greater in quantity and 157 per cent in value contrasted with the earlier period and inasmuch as the gross increase in value was only £1,751,000 or 20 per cent, there obviously must have been certain classes of imports which decreased, but there is no information available as yet to denote which they were.

The statement was officially made that 1627 German bicycles were imported from Germany during 1920 valued at £7,081, and that "there is no doubt whatever they can be imported at considerably less than the price at which they can be manufactured" in the United Kingdom. A further official comment was that "Imports from Germany have doubtless contributed to some extent to the depression of the labor market in this country."

French Tariff Bars German-Austrian Cars

PARIS, April 11—(*By cable to* AUTOMOTIVE INDUSTRIES)—A special import tariff applying only to Germany and Austria has been adopted by the French government. It stipulates a duty of 180 per cent ad valorem on imports of passenger cars and 200 per cent on trucks.

Jean Chassagne has entered a Peugeot in the Indianapolis sweepstakes.

Ralph DePalma has drawn No. 1 position in the French Grand Prix.

TO BUILD PLANES IN JAPAN

WASHINGTON, April 9—A group of British airplane construction experts has arrived in Nagoya, Japan, reports Consul Hawley, under a three-year contract with the Mitsubishi Co. to supervise the construction of airplanes in all details. It is expected that a complete airplane manufacturing plant will be organized, capable of turning out airplanes of the most approved type for all purposes.

Fiat Plant Again Faces Serious Labor Troubles

NEW YORK, April 11—Dispatches from Turin, Italy, say that the situation resulting from the dismissal of workmen in the Fiat works is becoming increasingly serious. The Prefect of Turin has made a futile attempt to mediate. The tension has been increased by the fear that the men may again occupy the works.

The problem of the Fiat company is similar to that of other establishments in disposing of superfluous labor since war orders ceased. The Fiat motor car plant carriage works and cylinder foundries have been closed, making idle 12,000 employees. The directors posted a notice stating that their position was a result of the "systematic opposition of workmen's organizations to a practical understanding." The clerical and expert staffs have been retained on holiday leave. The factories are occupied by troops.

Michelin Closes Down Plant

The Michelin Tire factory in Turin also is closed as a result of an attempt to reduce the number of workers to 1200. The employees protested against this decision and declared that instead of reducing the number of employees the factory should be worked only three days a week. The directors refused to agree and the factory was closed.

INDUSTRIAL NOTES

Handley-Knight Co., Kalamazoo, Mich., will soon install in its plant a complete finishing department and in the future all bodies will be bought in the rough and painted, varnished and upholstered in Kalamazoo. The new departments will give employment to about 50 additional hands.

Code Mfg. Co., Chicago, has been incorporated under the laws of Illinois to manufacture ratchet wrenches, visors and oilers. The company has been in production for the last six months. J. R. Oyott is president; William E. Code, vice-president, and A. L. Rousseau general manager.

Auto Specialties Mfg. Co., St. Joseph, Mich., in addition to its line of Bair top holders, automobile jacks and malleable iron castings, has acquired all patents and manufacturing rights on the shock absorbers for Ford cars, formerly known under the name "Burgess."

Sandusky Tractor Co., Sandusky, Ohio, has been chartered with an authorized capital of $100,000, to manufacture and sell tractors of all kinds. At first the tractors will be designed for agricultural purposes, and it is proposed to go into other lines.

Edward Valve & Mfg. Co., in order to centralize control of its industry, promote economy and better serve its customers, has moved its general offices from Chicago to its factory located at East Chicago, Ind.

Hughson & Merton, Inc., San Francisco and Los Angeles has been appointed sales representative for the Lane Bros. Co., Poughkeepsie, N. Y., manufacturers of sliding door hangers and H-C jacks.

Thomart Motor Co., Kent, Ohio, has been endorsed by the Kent Chamber of Commerce after an investigation into the management and financial standing of the company.

Victor Rubber Co. will establish general offices in the downtown section of Springfield, Ohio, instead of maintaining the offices at the factory as formerly.

TERMAAT-MONAHAN SOLD

OSHKOSH, WIS., April 11—The International Cultivator Corp., New York, has bid in the property of the Termaat-Monahan Mfg. Co., this city, at receiver's auction and intends to reopen the plant for the manufacture of gas engines, farm power units, lighting systems, etc. The purchase involves about $90.000. The International corporation has filed articles and been granted a charter to do business in Wisconsin.

RECEIVERS OPERATE PHELPS

COLUMBUS, April 11—The Phelps Mfg. Co. of Columbus, makers of the Phelps wire wheels for automobiles, which has been in the hands of J. H. Weisenback and Thomas W. Pickard as receivers for several months, is resuming operations. For a time the plant was shut down but now with a revival in the demand for wheels production is starting up under the receivers. Some of the machinery is being disposed of.

WITHDRAW OFFER FOR PLANT

LOUISVILLE, April 11—Withdrawal by the Collapsible Wheel Co. of its $172,500 offer for the property of the bankrupt Kentucky Steel & Iron Co. marked proceedings Saturday in the court of Referee George Du Relle. The case was passed to Tuesday. The offer of the Collapsible Wheel Co., a Delaware corporation, was made by L. Culbreath, Asheville, N. C. The bid was withdrawn, it is understood, because representatives of the wheel company feared possible litigation on the part of creditors who had objected to the sale. The wheel company is capitalized, it is said, at $2,000,000.

Labor Statistics Show Car Increases Steady

WASHINGTON, April 9—Increased activity in the automotive industry is reflected in the report of the United States Employment Service showing a gain of 28.1 per cent in the number employed during March. The amount of increase listed from reports under "Vehicles for Land Transportation" was 31,342. Of the total reported employed in 14 groups on March 31, the relative weight of the vehicle industry was 8.9 per cent. Though slight increases were reported in the employment situation in 4 other industries, the gain was not comparable to that registered in the automobile industry.

Reports from 1424 firms, usually employing 501 or more, showed that 1,587,786 workers were employed on March 31 as against 1,612,611 on Feb. 28, a net decrease of 24,825, or 1.5 per cent. The net decrease in employment since Jan. 31 has been 40,348, or 2.5 per cent.

While agents of the Labor Department in Detroit reported that automobile manufacturers were proceeding with caution, it was pointed out that the situation indicated permanent movement and steady increase in the working forces.

Throughout the States of Ohio, Illinois, Indiana, Michigan and Wisconsin the automobile and textile groups are in increasingly better condition but no other group shows appreciable improvement.

EQUIPMENT SELLS IN TEXAS

FORT WORTH, April 11—The recent business depression in the automobile business in the Southwest is over. So the guests of the Equipment Co. of Texas were told by President H. R. Shedd. As evidence, he declared the March business had been the best in the firm's history and April was starting off equally well. The guests were salesmen of the company in the Texas territory, and the meeting an annual affair. Plans for extending the 1921 business were mapped out.

KANSAS CITY CONTINUES GAINS

KANSAS CITY, April 11—March was for several distributors of standard makes of passenger cars, a better month than March 1920 in Kansas City and territory. The chief gain was in retail sales. All cars, both standard and less well known makes, moved better at retail in March than in several months past.

METAL MARKETS

As for its effect on the steel market, Tuesday evening's long expected announcement by the United States Steel Corp. of a reduction in its prices which practically brings them to the independents' level, one need but recall the fact that the news was given out after the close of the stock market and this circumstance is more noteworthy than any of the price adjustment details.

Attention has been previously directed in these reports that the most significant feature of any price changes by the Corporation lies in the generally accepted theory that when the Corporation promulgates price changes they are almost invariably predicated upon fairly precise knowledge of orders for representative tonnages that have been hanging fire and that can be booked immediately following the price change. If there be any such latent business overhanging the market, they are from the structural, railroad and other lines of steel consumption. Whatever the future may bring forth, however, the fact remains that the automotive industries so far furnish the staff on which iron and steel producers lean for support. Compared with war days, the tonnages involved in new business emanating from passenger car builders and automotive parts makers may be light, but the impressive feature is the steadily growing number of orders and, perhaps still more so, the broadening of this demand over departments of the market heretofore entirely neglected. Builders of low-priced passenger cars are figuring prominently in the market for tubular goods, and about the only worth while sale of ferromanganese that has been made of late was one in which a Detroit passenger car and tractor interest figured as buyer. It is gratifying to note that Mahoning valley sheet makers are setting up a vociferous plaint, because nothing but absolutely perfect sheets pass muster in automotive plants these days and that rejections for defects have never been so numerous as at the present. The sheet mills themselves will in the end be the greatest gainers from this exacting method.

Pig Iron—With two-thirds of the stacks blown out and production cut to the lowest level in many years, a steadying tendency is in evidence; at $25, valley, both malleable and foundry may even be called firm.

Steel—While one of the Corporation's regular automotive customers is said to have recently placed an order for 5,000 tons of steel bars at 2.35c., Pittsburgh, other interests have booked business in the last few days at 2.10c. Cold-finished steel bars are offered at as low as 3c. Detroit passenger car builders continue to release suspended tonnages for specialties. Strip steel is also moving in carload lots to the automotive trade. Orders for several hundred tons of sheets are reported to have been placed in the Pittsburgh and Chicago markets.

Aluminum—Most of the resellers and importers are now asking 24c. for virgin ingots, 98@99 per cent pure. German metal is still being offered at bargain prices, but purchases involve undesirable terms of payment.

Copper—The shutdown of 75 per cent of the mines will not be felt in refinery output until June.

Tin—Speculative ups and downs continue with consuming demand light.

Lead—Quiet and of a routine character.

Zinc—Slightly more demand from galvanizers; brass mills still apathetic.

FINANCIAL NOTES

Wright Aeronautical Corp., for the year ended Dec. 31, reports net profits, after charges and Federal taxes, of $411,349, which is equivalent to $1.83 a share on the 224,390 shares of capital stock of no par value outstanding. Total sales for the year were $1,486,124, while the costs of sales were $1,124,058, leaving a profit of $362,066.

Mullins Body Co. directors voted to pass the dividend payment due on common stock. Heretofore the company has been paying at the rate of $1 quarterly on common. The regular quarterly dividend of $2 a share on preferred stock will be paid May 1. The passing of the dividend is said to be due to the lockout which has closed the company's plants for more than a month.

Packard Motor Car Co. is issuing $10,000,000 in coupon bonds in interchangeable denomination of $1000 and $500, registerable as to principal only. The bonds are to be redeemable at the option of the company on any interest date, on 60 days notice as a whole but not in part, at 107½ per cent on or before April 15, 1926, and at 105 per cent thereafter. The company covenants to set aside quarterly sums equal annually to one-tenth of the largest amount of these bonds which has ever been outstanding, such sums to be used as far as possible, for the purchase of bonds in the open market at not exceeding 105 per cent and interest.

French Battery & Carbon Co., Madison, Wis., is being reorganized on a larger and broader scale to take over the manufacture of a battery under patents owned by the Federal Battery Co., Cleveland. The French company will start work shortly on a large factory addition. Its new capitalization consists of $300,000 of common stock, $700,000 of first preferred and $1,000,000 of second preferred, both 8 per cent stock. It is understood that the Federal Battery Co. becomes owner of a large block of the first preferred.

Spicer Mfg. Corp. reports for 1920 sales amounting to $17,862,929.94. Net profits after depreciation and deduction of interest were $1,448,752.79, with reduction of inventory to present prices and provision for Federal taxes, net profit was $646,022 08, equivalent to $21.33 on the preferred stock. Despite unfavorable conditions, the company has paid the regular preferred dividends, a 50 per cent dividend on the common and retired the first series of five year 5 per cent notes amounting to $600,000.

Independent Pneumatic Tool Co., Chicago, earned $1,308,457 in 1920 before dividends and charges, compared with $1,439,376 the previous year. Dividends and charges required $418,874 from the surplus in 1920, where in 1919 the surplus was increased by $727,694. Total assets of the company are shown as $5,618,546, cash totaling $655,041 and inventories $623,435.

Federal Rubber Co. in a balance sheet as of Dec. 31, 1920, shows total assets of $19,618,321.21 and a surplus of $1,245,826.25. The assets include inventories totaling $7,836,123.58, of which $5,061,625.06 represented finished product at factory and warehouses. Cash in banks and on hand is shown as $432,605.08. Net sales for the year were $13,911,993.22.

Ohio Body & Blower Co. for the year ended Dec. 31, 1920, reports net sales of $2,737,250. Expenses, depreciation and inventory adjustment amounted to $2,967,153, leaving an operating loss of $229,903. After payment of interest and dividends there was a net deficit of $596,629 for the year. The surplus was reduced to $1,576,100.

Stutz Motor Car Co., in a comparative balance sheet as of Dec. 31, shows assets of $8,032,522, in which is included cash of $217,043 and an inventory of $3,049,238. The surplus of $5,404,414 is $368,544 less than the 1919 surplus. On Dec. 31, it is declared, the net tangible assets applicable to the capital stock, amounted to $6,404,414, or $32.02 a share.

Keystone Tire & Rubber Co. reports net loss after expenses, interest and taxes in 1920 of $317,704. Profit and loss deficit on Dec. 31 was $384,623. The company reported total assets of $4,650,135, which included cash of $105,032 and inventory $860,921. Accounts receivable totaled $2,243,912.

Stewart Warner Speedometer Corp. directors, after their meeting in Chicago this week, declared that the quarterly dividend would be cut from $1 to 50 cents a share April 20. The company reports retail trade back to normal.

Sewell Cushion Wheel Co., Detroit, has paid the regular quarterly dividend of 2 per cent on preferred stock and 8 per cent on common. At the annual meeting of directors April 5 all of the old officers, headed by H. J. Sewell, president, were re-elected.

Service Motor Truck Co., Wabash, Ind., has changed the par value of its common stock from $100 a share to $10 a share, and the number of its shares from 35,000 to 350,000.

United States Rubber Co. has declared regular quarterly dividends of $2 a share on common stock and $2 a share on preferred, both payable April 30.

Kelsey Wheel Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock payable May 2 to stock of record April 23.

United States Motor Truck Co. paid the regular 1¾ per cent dividend of preferred stock on April 10.

Wisconsin Truck Merger Awaits Stock Action

KENOSHA, WIS., APRIL 13.—Consolidation of the Winther Motor Truck Co., the Kenosha Wheel & Axle Co. and the Marwin Truck Corp. will be announced April 29 if the stockholders ratify the action proposed by the directors and they are expected to give their assent.

There is a strong probability that this combination will be expanded later by the addition of a half-dozen representative truck manufacturing companies. Under the plan proposed each factory would manufacture a truck of one capacity.

The chief obstacle thus far to the larger combination has been the question of financing. The bankers approached on the subject are understood to have given it their approval but have advised waiting a few months until conditions improve in the money market.

CREDITORS ASK NEW RECEIVER

INDIANAPOLIS, April 9—Three Indianapolis firms, creditors of the Van Briggle Motor Device Co., filed papers in Federal court April 7 against William R. Hirst, receiver of the company, asking that a receiver in bankruptcy be appointed in Federal court.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, April 14—The attention of the financial community last week was directed, in the main, toward prospects for easier money. Continued liquidation in the industrial and commercial fields, the steady improvement in the reserve position of the Federal Reserve System, the continued stream of gold imports, and rumors of possible lowering of official rates abroad lead many to think that a permanent lowering of money rates was at hand. While the industrial situation in England practically prohibited the expected lowering of the Bank of England's official discount rate, the National Bank of Switzerland was the one bank on the continent which did lower its discount rate, which had been in effect since August, 1919. The rate now is 4½ per cent as against an old rate of 5 per cent; and the Bank's rate for advances against security was lowered to 5½ per cent.

While money was easier in New York there was no assurance of a lasting change. Call money ruled from 5 per cent cent to 7 per cent as against 6 per cent to 7 per cent the previous week. The renewal rate on Monday of last week was 6½ per cent and thereafter did not get above 6 per cent until Monday of this week, when 7 per cent was quoted.

The Federal Reserve Banks as a whole last week gained $17,571,000 in gold reserves, making an increase of $204,677,000 since Dec. 30, 1920. Total gold reserves at $2,264,010,000 were at the highest point in the history of the Federal Reserve System. Rediscounts were $213,698,000 less than they were four weeks ago and are at the lowest point since Jan. 23, 1920. Federal Reserve notes in circulation at $2,893,964,000 are at the lowest point since Feb. 9, 1920, and are $14,189,000 less than a week ago.

Total earning assets declined $75,580,000 and total deposits $43,917,000. Total bills on hand were also less by $78,727,000.

Bank clearings for 193 cities in March were $31,600,363,064 as against $41,338,259,6991 in March, 1920, making a decline of 25 per cent. For the three months ended March 31, clearings were $91,245,362,890 or 21.6 per cent less than for the corresponding period of 1920. Bank clearings for New York showed the same tendency. March clearings were 25.3 per cent less than for March a year ago, and clearings for the three months were 21.8 per cent less than for the first three months of 1920.

PLAN QUICK SALE OF IMMEL

COLUMBUS, April 11—The reorganization plans of the creditor's committee of the Immel Co. are working out satisfactorily, according to A. G. Gilmour chairman of the committee and it is likely that the receiver, Robert H. Schryver will offer the plant and assets for sale within 30 days.

Men of the Industry

Joseph L. Bardig, advertising manager of the motor bearings division of the Hyatt Roller Bearing Co., has joined the staff of the Campbell-Ewald Co. to assist in sales promotion work. Previous to his appointment as advertising manager of the motor bearings division of the Hyatt Roller Bearing Co. he was assistant advertising manager of the motor equipment division of the General Motors Corp. In this capacity he directed advertising of the Remy Electric Co., the Klaxon Co., the Harrison Radiator Co. and the Jaxon Steel Products Co.

John E. Tracy, who served four years as general sales manager of the Sterling Motor Truck Co., Milwaukee, has resigned, to accept the position of vice-president and director of sales of the Hicks-Parrett Tractor Co., Chicago, a new $3,500,000 concern which is manufacturing heavy duty truck units and fire apparatus. Tracy was the first president of the National Association of Motor Truck Sales Managers, in the organization of which he took a leading part. He assumed his new duties April 4.

S. M. Williams, chairman of the Federal Highway Council, announces the election of four new members to the executive committe of the Council: W. J. L. Banham, general traffic manager, Otis Elevator Co.; David Beecroft, president, Society of Automotive Engineers, and directing editor, Class Journal Co.; H. W. Alden, vice-president, Timken-Detroit Axle Co., and S. P. Leeds, president, Atlantic City Chamber of Commerce.

R. C. Hawley has rejoined the sales staff of the Remy Electric Co. About a year ago Hawley resigned from the Remy sales department to take up an electrical engineering project of his own. Prior to that time he was a member of the Remy organization since 1918, coming from the Mitchell Motor Car Co., where he was engineer in charge of electrical installation.

Stanley E. Knauss, who has been closely connected with the sale of commercial aircraft since the war and who for the last two years has been sales and advertising manager for Continental Aircraft, Inc., has been made sales manager of the Stout Engineering Laboratories, Inc., Detroit, and will assume his new duties immediately.

George D. Wilcox, director of sales and advertising for Commerce Motor Car Co., Detroit, has been promoted to general manager. Wilcox has been in charge of sales for the last seven years both in America and the export field. O. D. Coppock, who has been assistant to Wilcox, becomes sales manager.

C. M. Bunnell, for the past ten years in charge of sales of automobile lamps for the Edison lamp works of General Electric Co., has accepted the position of director of branches with the Splitdorf Electrical Co., with headquarters at the general offices of the company, Newark, N. J.

Worth Colwell, who with Edward F. Korbel has handled publicity for most of the automobile exhibits in New York in recent years, will sail for Europe the last week in April to study exhibits abroad. Colwell is also president of the Rowland Advertising Co., Inc.

W. E. Baker has been appointed assistant general sales manager of the I. J. Cooper Rubber Co., Cincinnati. He was formerly sales manager of the Cincinnati Time Recorder Co. and prior to that was sales manager of the E. A. Myers Co., Pittsburgh.

C. N. Eason, vice-president of the Hyatt Roller Bearing Co., has become associated with the Samson Tractor Co., Janesville, Wis., division of General Motors, as assistant to President J. A. Craig and supervisor of the engineering department.

Elwood Haynes, president of the Haynes Automobile Co., Kokomo, Ind., together with three brothers, has donated to the city of Portland, Ind., a large tract in the northwestern part of that city to be used as a public park.

Harry Doty, formerly branch manager at Chicago for the Haynes Automobile Co., has been appointed sales manager for the Premier Car Corp., with headquarters at the factory in Indianapolis.

L. E. DeGroat, formerly of Timken-Detroit Axle Co., has joined the Acme Motor Truck Co., Cadillac, in charge of dealer promotion work.

Herbert Y. McMullen, formerly connected with the Trackless Transportation Corp., New York, has resigned his position.

H. D. Minchin, formerly sales manager of Lewis Searing & Co., is now general sales manager of the Field Body Corp.

Robert I. Erlichman resigned as president of the General Utility Co. and was succeeded by A. H. P. Leuf.

H. W. Scholl has resigned as sales manager of the Splitdorf Electrical Co., Newark, N. J.

N.A.C.C. Names Committee to Confer with N.A.D.A.

NEW YORK, April 12—Arrangements were completed to-day by the National Automobile Chamber of Commerce, for the first of a series of conferences with the National Automobile Dealers Association, at which problems of the industry affecting both manufacturer and dealer are to be discussed. The initial session will be held at the Detroit Athletic Club, Detroit, May 9.

The following committee was appointed by President Clifton to represent the N. A. C. C. at the conference:

W. C. Sills, sales manager, Chevrolet; C. B. Voorhis, sales manager, Nash; C. W. Matheson, sales manager, Dodge; Hal B. Boulden, sales manager, Selden Motor Truck Co., and F. E. Connor, sales manager of Chandler.

Southern Money Easier, Farmers Pay Off Loans

ATLANTA, April 12—Business conditions over the South continue on the upward trend with the result that there is a much better feeling as regards the outlook for the future in industrial and commercial circles than the section has known for months.

The Federal Reserve Bank of Atlanta reports that the farmers in the sixth district, which comprises most of the states of the Southeastern area, are still holding between 50 and 60 per cent of last year's cotton crop, and that approximately half of this is pledged as collateral for loans. Just how long this cotton will continue to be held depends to a large extent on what Southern producers do this year in the way of acreage reduction. A drastic reduction would serve to increase cotton prices and result in the sale of considerable of the staple now being held. This, naturally, would still further improve the financial condition of the section. There is every indication that the acreage will be reduced from 30 to 50 per cent.

Governor M. B. Wellborn, of the Federal Reserve Bank of Atlanta, said that "if liquidation of borrowings in the Atlanta district continues as it has the past three months, the directors of the bank will consider lowering the discount rate."

Ford Orders, 102,000; Look for Million Year

NEW YORK, April 13—The average production at the Ford plant is now about 3300 cars a day and the plan is to increase production until it reaches approximately 4000 daily. No definite schedule has been fixed for the year but the total is expected to approximate 1,000,000. Actual sales in the domestic market for March were 87,221 cars and 4708 tractors. Orders on hand for cars total 102,000. The number of men employed is about 32,000.

Henry Ford is entirely satisfied with the present outlook. Bank notes to the amount of $24,000,000 will be due April 18 and it is understood he expects to pay at least 25 per cent of them and is confident he will encounter no difficulty in paying the remainder.

Theft Protective Bureau to Issue Radiator Disks

NEW YORK, April 12—The Automobile Protective and Information Bureau of Chicago, representing a large number of insurance companies handling automobile lines in the Middle West, plans to distribute to policy holders brilliant metal disks to be placed on radiators reading "This Car is Protected by the Automobile Protective and Information Bureau of Chicago." The William J. Burns Detective Agency, Inc., in conjunction with the Rent Renton Auto Recovery service in this city, has been planning a similar device. Detectives assert that such placards on automobiles are found to be worth while deterrents to thieves.

PAIGE STAGES NATIONAL WEEK

DETROIT, April 9—Paige Motor Car Co. dealers throughout the United States are participating in a national demonstration week which began Monday. With all of the larger shows past factory executives decided that the time was most opportune for a spring salon and a real Paige show in each city at the Paige salesrooms.

The Paige factory is working practically full time at close to 100 per cent production in anticipation of demand resulting from the week's efforts.

Calendar

FOREIGN SHOWS

April 16 - May 8—Bosquet, Algiers; Algerian Agricultural Fair, Motor Cars, Machinery and Tractors.

Apr. 20 - May 5 — Mexico City, Mexican Automobile Show, National Theatre Bldg.

April, 1921—Sofia, Bulgaria, Tractor Trials, under the Bulgarian Ministry of Agriculture.

May 28, 1921 — Czecho-Slovak International Automobile Exposition of Cars. Trucks, Tractors, Motorcycles and Equipment. Prague.

May 28-June 8—International Automobile Exhibition, Basle, Switzerland.

June, 1921—Reykjavik, Iceland, Agricultural Exhibition—Agricultural Machinery—Icelander Agricultural Society, Reykjavik, Iceland.

September—Buenos Aires, Argentina. Passenger Cars and Equipment. La Pabellon de las Rosas. Automovil Club Argentino.

September — Buenos Aires, Argentina, Cars, Trucks, Tractors, Farm Lighting Plants and Power Farming Machinery. Palermo Park; Sociedad Rural Argentina.

September—Luxemburg, Luxemburg Agricultural Sample Exhibition.

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais. Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.

Nov. 4-12 — London, British Motor Show, Society Motor Mfrs. and Traders.

CONVENTIONS

May 4-7 — Cleveland, National Foreign Trade Council.

May 17-19—Buffalo, Convention of Factory Service Managers, Auspices of Service Committee, N. A. C. C.

May 24-28 — West Baden, Ind., Summer Meeting Society of Automotive Engineers, West Baden Springs Hotel.

July 4-9 — Mackinac Island, Mich., Summer Meeting Automobile Equipment Association.

Oct. 12-14, 1921—Chicago. Twenty-eighth Annual Convention National Implement & Vehicle Ass'n.

RACES

June 18—Uniontown, Pa., Speedway Events.

July 25—Grand Prix, Le Mans.

Labor Day—Uniontown, Pa., Autumn Classic.

S. A. E. MEETINGS

Buffalo section—April 19—Paper on "Carbureter Performance," by F. C. Mock.

Dayton section—May 3.

Parts Service Problem Referred to Committees

(*Continued from page* 834)

cheaply and would naturally be heartily in favor of the plan. Service must be put on a commercial basis if the industry is to live, Rognan asserted.

Otto Armleder, president of the O Armleder Co., took the parts makers to task for not fulfilling their obligation to the manufacturer and his customer in their attitude on replacements.

"We stand behind every unit of our product," said he, "and when you send out an improper product it is your duty to replace it and assume all expense. It is the great evil of the business. You parts makers must start right. We owe our customers an obligation and you owe the same to us."

In support of the plan of the parts makers, Yeoman recited the history of it dating from the first station established five years ago which he said was brought about by continued complaint from customers that they could not get service. With reference to the plea for the dealers, Yeoman said the dealer profit on parts was so small as to be of virtually no consideration and he cited numerous figures to sustain his contention. He insisted the only reason Continental was operating the service station plan was to insure service to users of Continental engines.

Underselling Market

Independents, Yeoman said, were selling to the dealers as cheaply as the parts makers can sell to the truck assembler. He said the parts makers felt that the plan was a big asset to the assembler and declared it was the earnest desire of the parts makers to co-operate with the assembler in convincing the consumer of the advantage of the assembled truck, thereby increasing the demand. The parts stocks in the stations now operating, Yeoman added, varied in values from $20,000 to $90,000, and he contended that many men had heavy building investments in addition.

He said it was the unanimous opinion of the parts makers that the truck manufacturers were unable to find dealers who could assure proper service, the inference being that there would be no inclination to recede from the present position.

Pulcher, who opened the discussion opposing the service station plan, said he had a grip full of communications from dealers opposing it. He declared the parts makers had done nothing for the dealers, whereas the truck manufacturer had taken care of them. The serious problem from the manufacturing standpoint, Pulcher said, was in keeping the dealer organizations intact and he declared the dealer's only profit in the last six months was from service. He asserted the manufacturer lost contact with his customer when that customer was able to go to a parts station for new parts rather than to the dealer.

Prices Vary as High as $40

Pulcher said prices varied as much as $40 in some instances and urged the need of standardization and printed price lists. He told of the trouble in getting dealers and in holding them and in citing concrete instances where his company had helped a dealer financially, demanded to know if the parts maker would have done that. If an inferior part goes out in a truck, Pulcher said, unless it comes back to the dealer the manufacturer knows nothing about it and the truck gets the blame. He said his company was ready to help the small assembler who was unable to maintain a large dealer organization, by giving him discounts and in every way. Pulcher declared his company was unalterably opposed to the stations operated by the parts maker.

The meeting, which had been transferred from the Detroit Athletic Club to the Wolverine Hotel for convenience of the large crowd expected, was called to order by President B. A. Gramm. Armleder read the resolution adopted by the truck association committee two weeks ago expressing unalterable opposition to the service station plan as detrimental to the interests of all concerned. On motion of Pulcher committees of six parts makers and six assemblers were named to formulate separate statements for presentation at the afternoon meeting and the morning session adjourned.

Endorse New Plan for Standard Parts

(*Continued from page* 835)

paid in for the benefit of creditors within 90 days. Dismissal of the receivers would follow success of the proposal.

Scott made it plain that the present status of the Standard Parts was brought about by an internal fight. J. O. Eaton, general manager of Standard Parts, and one of the receivers, is in California, and he was unable to attend the gathering.

It was pointed out that while debts aggregate $9,500,000, the assets are more than $20,000,000. Cash and accounts receivable aggregate $2,200,000; inventory $4,000,000; stock in the Bock Ball Bearing Co., $2,000,000; plants were appraised at $11,700,000; holdings in the Eaton Axle Co., $1,200,000.

It was brought out in the discussion that while earnings of the company had at times dropped to $250,000 a month, the figure for April will approximate $800,000. Under normal conditions the company can earn $3,000,000 a year, and $6,000,000 under more favorable conditions.

Big Dirigible to Fly 8000 Miles to Coast

NEW YORK, April 12—The ZR-2 formerly the R-38, which the United States Navy is having constructed in England and which is the largest airship ever built, will be flown to the United States in May or June. It is planned, if possible, to fly the great dirigible direct to the Pacific Coast, thus making in its maiden flight a non-stop record of approximately 8000 miles.

The ZR-2 is almost one-third larger, far more powerful and with twice the cruising radius of the R-34, which in 1919 made the round trip of the Atlantic Ocean after laying over several days on Long Island. It is being rushed to completion at the Royal Airship Works, Cardington, Bedford. Its engines are being built by Sunbeam. Dimensions of the craft are 700 ft. long and 85 ft. diameter.